The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa

by

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Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third-party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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Summary

Introduction: Nutrition information on food labels is a population-based approach to nutrition education that enables consumers to make healthier food choices. In South Africa (SA) there has been a paucity of data on food and nutrition labelling and the consumer since the publication of the new food-labelling legislation.

Rationale: A better understanding of how consumers engage with nutrition information on food labels is required to make recommendations to improve education campaigns to assist consumers in making healthier food choices. Additionally, food-labelling factors that influence consumer food-purchasing behaviour, and expectations/barriers to reading nutrition information on labels, could assist in making recommendations for a single front-of-pack labelling scheme to be used in SA as well as for its development.

Methods: A multi-stage mixed-methods design was employed. In phase one, a cross-sectional, descriptive, interviewer-administered electronic survey was conducted on adult consumers (*N*=960) at 16 randomly selected grocery stores in four health districts of Cape Town (CT). In phase two, nine focus-group discussions (FGDs) were held with purposively selected consumers (*N*=67) to further explore phase one's findings and what type of health-endorsement logos (HELs) are preferred and why. In phase three, ten HELs were developed by a graphic design company based on the data collected in previous phases. A modified Delphi technique, conducted with experts in the fields of nutrition/food science (*N*=19), was employed to eliminate lowest scoring HELs and to improve the design of the HELs. Participants from the initial survey and/or FGDs took part in pilot testing of the HELs during four FGDs.

Results: Main self-reported factors influencing food-purchasing behaviour included price, sell-by date and products on special/promotion, with price being the most important. Taste, brand loyalty, marketing and convenience were also major influencers. Less than half of participants indicated that nutrition information always influenced their product choice. The main reasons for not reading nutrition information included buying the same type of product all the time and being uninterested in the information. In exploring this further with FGDs, a lack of time, poor understanding of nutrition information (specifically the nutrition information table) and lack of trust in labelling information also emerged as important factors. The mean food and nutrition label knowledge score was 44%. The majority of participants

preferred a single HEL to be used on food products as they don't understand the various HELs used. Such a logo should include pictures/symbols directly related to health and/or food and should state "healthy choice". During the pilot testing, three HELs (developed and improved during two rounds of scoring) received overall rankings of 3.08/5, 3.28/5 and 3.39/5 respectively.

Conclusion: CT consumers have poor food and nutrition label knowledge and nutrition information on food labels is not a major influencer of food-purchasing behaviour. Consumers struggle to understand the nutrition information provided and have expressed a need for a single HEL to be used. Consumer education on utilising the nutrition information on labels and the development of a single HEL for SA, could assist consumers to make healthier food choices and in turn address the high incidence of non-communicable diseases in SA.

Opsomming

Inleiding: Voedingsinligting op voedseletikette is ‘n bevolkingsgebasseerde benadering tot voedingsopvoeding wat verbruikers in staat stel om gesonder voedselkeuses te maak. In Suid-Afrika (SA), sedert die publikasie van die nuwe voedseletiketteringswetgewing, is daar ‘n gebrek aan data oor voedsel- en voedingsetikettering en die verbruiker.

Rasionaal: ‘n Beter begrip van hoe verbruikers meegaan met voedingsinligting op voedseletikette word benodig om aanbevelings te kan maak om opvoedingsveldtogte te verbeter om verbruikers te help om gesonder voedselkeuses te maak. Daarbenewens, voedseletiketteringsfaktore wat die verbruiker se voedselaankope gedrag beïnvloed, asook verwagtinge/hindernisse tot die lees van voedingsinligting op etikette, kan help om aanbevelings te maak vir ‘n enkel voorkant-van-verpakking etikketeringsbenadering vir gebruik in SA en vir die ontwikkeling daarvan.

Metodes: ‘n Multi-stadium gemengde metodes ontwerp is gevolg. In fase een is ‘n deursnit, beskrywende, onderhoudvoerder-geadministreerde elektroniese opname gedoen met volwasse verbruikers (*N*=960) by 16 ewekansige geselekeerde kruidenierswinkels in vier gesondheidsdistrikte van Kaapstad. In fase twee is nege fokusgroep besprekings (FGBs) gehou met doelbewus geselekteerde verbruikers (*N*=67) om fase een bevindinge verder te ondersoek asook watter tipe gesondheidsonderskryfde logos (GOLs) word verkies en hoekom. ‘n Aangepaste Delphi tegniek is gebruik, met kundiges in die areas van voeding/voedselwetenskappe (*N*=19), om die GOLs met die laagste tellings te elimineer en die ontwerp van die GOLs te verbeter. Deelnemers van die aanvanklike opname en/of FGBs het deelgeneem aan die loodstudietoetsing van die GOLs tydens vier FGBs.

Resultate: Die belangrikste self-gerapporteerde faktore wat voedselaankope gedrag beïnvloed sluit in prys, vervaldatum en produkte op afslag/promosie, met prys die belangrikste. Smaak, handelsmerk lojaliteit, bemarking en gerief was ook belangrike invloede. Minder as die helfte van deelnemers het aangedui dat die voedingsinligting altyd hul produkkeuses beïnvloed. Die hoofredes waarom voedingsinligting nie gelees word nie sluit in: die koop van dieselfde tipe produkte deurgaans en verbruikers is nie geinteresseerd in die inligting nie. Met verdere ondersoek met behulp van FGBs, het ‘n gebrek aan tyd, swak begrip van voedingsinligting (spesifiek die voedingsinligtingstabel) en gebrek aan vertroue in

etiketteringsinligting ook voorgekom as belangrike invloede. Die gemiddelde voedsel- en voedingsetiket kennis telling was 44%. Die meerderheid van die deelnemers sal ‘n enkel GOLs op voedselprodukte verkies aangesien hul nie die verskillende GOLs wat tans gebruik word verstaan nie. Hierdie logo moet prentjies/simbole wat direk verband hou met gesondheid en/of voedsel bevat en “healthy choice” moet daarop staan. Gedurende die loodstudietoetsing het drie GOLs (ontwikkel en verbeter deur twee rondtes waar tellings verskaf is), algehele posisies van 3.08/5, 3.28/5 en 3.39/5 onderskeidelik ontvang.

Samevatting: Verbruikers van Kaapstad het swak voeding- en voedseletiket kennis en voedingsinligting op etikette het nie ‘n groot invloed op voedselaankope gedrag nie. Verbruikers sukkel om die voedingsinligting wat verskaf word te verstaan en het die behoefte uitgespreek vir die gebruik van ‘n enkel GOL. Opvoeding van die verbruiker oor die gebruik van voedingsinligting op etikette en die ontwikkeling van ‘n enkel GOL vir SA, kan die verbruiker help om gesonder voedselkeuses te maak en sodoende die hoë insidensie van nie-oordraagbare siektes in SA aanspreek.

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It always seems impossible until it's done.

- **Nelson Mandela**

Contributions by principal researcher and fellow researchers

The principal researcher, Nelene Koen, developed the idea and the protocol. The principal researcher planned the study, undertook data collection (with research assistance), captured the data for analyses, analysed the data with the assistance of a statistician (Prof. D Nel), interpreted the data and drafted the thesis. Prof. R Blaauw and Prof. E Wentzel-Viljoen (supervisors) provided input at all stages and revised the protocol and thesis.

Language and technical editing of this thesis was done by Dr Elizabeth van Aswegen BA (Bibl), BA (Hons), MA, DLitt, FSAILIS.

Table of Contents

List of Figures

List of Tables

Chapter 7 Critical Discussion of Main Findings, Limitations, Recommendations and Conclusion

Table 7.1: Demographic profile of phase one study participants (N=960) compared to the demographic profile of the population of the City of Cape Town

List of Abbreviations / Acronyms

ADSA:	Association for Dietetics in South Africa
AIDS:	Acquired Immune Deficiency Syndrome
ANOVA:	Analysis of Variance
BMI:	Body Mass Index
CANSA:	Cancer Association of South Africa
DRI(s):	Dietary Reference Intake(s)
FGB(s):	Fokusgroep Bespreking(s)
FGD(s):	Focus-group Discussion(s)
FSANZ:	Food Standards Australia New Zealand
GDA(s):	Guideline Daily Amount(s)
GOL(s):	Gesondheidsonderskryfde Logo(s)
HEL(s):	Health-endorsement logo(s)
HIV:	Human Immunodeficiency Virus
HREC:	Health Research Ethics Committee
HSFSA:	Heart and Stroke Foundation South Africa
NCD(s):	Non-Communicable Disease(s)
NINR(s):	Nutrition Information Non-reader(s)
NIR(s):	Nutrition Information Reader(s)
NRVs:	Nutrient Reference Value(s)
PURE study:	Prospective Urban and Rural Epidemiological study
RDA:	Recommended Daily Allowance
SA:	South Africa / Suid-Afrika
SAARF:	South African Audience Research Foundation
SADHS:	South African Demographic and Health Survey
SANHANES I:	South African National Health and Nutrition Examination Survey
QUID:	Quantitative Ingredient Declaration
WHO:	World Health Organization
WW:	Woolworths
UK:	United Kingdom
USA:	United States of America

Glossary

Content validity:

Requires that the measure accounts for all the elements of the variable or concept being investigated.[1]

Expert:

A person who is very knowledgeable about or skilful in a particular area.[2]

Face validity:

Refers to the extent to which the measure or question makes sense to those knowledgeable about the subject or to interviewers familiar with the language and culture of participants.[1]

Food label:

Any written, printed or graphic matter that is present on the label, accompanies the food, or is displayed near the food, including that for the purpose of promoting its sale or disposal.[3]

Front-of-pack labelling scheme:

Seeks to provide consumers with simplified at-a-glance information to supplement that provided on the back of pack to help them make healthier food choices.[4] Examples of front-of-pack labelling schemes include: single healthy eating symbols or logos, traffic-light labelling, hybrid of traffic light and percentage guidelines daily amount (GDA), and percent GDAs where the percentage of the GDA for key nutrients in a serving/portion or 100g of food is given.[5]

Health-endorsement logo:

A health-endorsement logo is a single healthy eating symbol that indicates which foods are healthier based on specific criteria. Examples of these include the Swedish Green Keyhole, heart symbol of the Heart and Stroke Foundation South Africa (HSFSA) and the Smart choices logo.[5]

Inductive reasoning:

The process by which research findings are derived from the data itself with no consideration of pre-existing theory.[6]

Label:

Any tag, brand, mark, pictorial, graphic or other descriptive matter, which is written, printed, stencilled, marked, embossed, impressed upon, or permanently attached to a container of a foodstuff, and includes labelling for the purpose of promoting its sale or disposal.[7]

Literate:

The ability to read and write, which is more strictly defined as the successful completion of a minimum of seven years of formal education.[8]

Low literacy or illiterate:

A person that did not complete Grade seven at school.[8]

Mixed-methods research:

Research in which the researcher collects and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches.[9]

Non-communicable diseases:

Non-communicable diseases (NCDs), also known as chronic diseases, are not passed from person to person, and are of long duration and generally slow progression. The four main types of NCDs are cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes. [10]

Nutrient profiling:

Nutrient profiling is the science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health. It can be used for different applications, including marketing of foods to children, health and nutrition claims, product-labelling logos or symbols, information and education, provision of food to public institutions, as well as economic tools to orient food consumption.[11]

Nutrition labelling:

The section of information on a food label that specifically declares nutrient content.[12]

Reliability:

Refers to the degree of similarity of the results obtained when the measurement is repeated on the same subject or the same group.[1]

Validity:

Refers to the extent to which a measurement instrument actually measures what it is meant to measure.[1]

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Chapter 1

Introduction

1.1 Identifying the research question and rationale for the study

Food labelling is a population-based approach to nutrition education that enables consumers to make healthier food choices by providing information at the point of purchase.[1] Nutrition labelling, the section of information on the food label that declares nutrient content,[2] is an important component of the food label and considered an important public health tool to educate consumers and reduce non-communicable diseases (NCDs).[1]

According to the World Health Organization (WHO) global status report on NCDs, NCDs are the leading causes of death globally, killing more people each year than all other causes combined.[3] In 2015, 39.5 million global deaths were due to NCDs.[4] NCD deaths are projected to increase by 15% worldwide between 2010 and 2020[5] and surpass communicable, perinatal and nutritional diseases as the most common cause of death by 2030 in African nations.[3] In South Africa (SA), with the rise in urbanisation and industrialisation, and concomitant economic and nutrition transition, as well as health services that are not always adequately equipped to deal with the issues, more people are becoming ill and dying from NCDs.[6-8] It is thus not surprising that the probability of dying between the ages of 30 and 70 years from the four main NCDs is 27% in SA[9] and on the increase.[5]

In terms of attributable deaths, raised blood pressure is the leading NCD risk factor globally, followed by tobacco use, raised blood glucose, physical inactivity, overweight and obesity.[5] In SA, in 2010, the factors which accounted for the greatest incidences of disease were alcohol abuse, overweight, obesity and raised blood pressure.[10] According to results from the recently conducted South African Demographic and Health Survey (SADHS), the prevalence of overweight, obesity and hypertension has increased over the past two decades, with 68% of women and 31% of men being overweight or obese, while 46% of women and 44% of men are hypertensive.[11]

In light of these statistics, a comprehensive and effective response including clear strategies and plans is needed to address the NCD burden globally and in SA. The NOURISHING framework of food policies developed by the World Cancer Research Fund International brings together key domains of action (food environment, food system, and behaviour change communication) and ten policy areas to promote healthy eating effectively and prevent NCDs. They recommend that governments should address all of these domains of action together

and implement policy actions from within all of the ten policy areas. Nutrition labelling standards and regulations are included as one policy area.[12]

To attain the overall health sector goal of "a long and healthy life for all" and to address the rising NCD epidemic, the South African government implemented the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013–2017. According to this plan, which includes specific targets and timelines, the prevention and control of NCDs can be achieved with the implementation of three major components: 1) the prevention of NCDs and the promotion of health and wellness at population, community and individual level, 2) improved control of NCDs through health system strengthening and reform, and 3) monitoring NCDs and their key risk factors, and carrying out innovative research.[7] Food labelling is considered to be a valuable[12] and relatively low-cost tool to assist in reaching the first goal of preventing NCDs and promoting health and wellness for all people.[7]

To support this national strategy, new interim food labelling regulations [Regulations Relating to the Labelling and Advertising of Foodstuffs (R146/2010)] were published in 2010, and came into effect in 2012.[13] In 2014, proposed amendments to this legislation were published for comment. The new draft legislation, Regulations Relating to the Labelling and Advertising of Foods (R429/2014), proposed several changes to the current legislation, including mandatory nutrition information labelling as well as regulations on health and nutrient content claims based on nutrient profiling.[14] One of the key objectives of the new proposed legislation is the promotion of healthier eating habits through improved labelling and advertising, thereby encouraging better food choices in order to improve public health.[15]

Nutrition labelling and consumer knowledge, use and understanding have been investigated extensively in developed countries.[16] These studies have reported associations between consumers who use (read, understand and utilise) the nutrition information on food labels, and more healthful food choices, such as lower fat, sugar, sodium and cholesterol consumption. Consumers using the nutrition information on food labels are also more likely to eat a healthier variety of foods, coupled with increased fibre, iron and vitamin C intakes.[16] There is, however, mixed evidence with respect to the ease[17, 18] or difficulty of using the nutrition information on food labels[19-21] and this is also dependent on the demographic profile of consumers.[16] It has been widely reported that some consumers struggle to understand the

nutrition information on food labels and many have difficulty with the quantitative information presented, preferring labels using graphics and symbols,[22-24] adjective labels[25] and labels with minimal numerical content.[26] Campos et al., who conducted a systematic review in 2011 on nutrition labels and pre-packaged food, recommend that research on the impact of nutrition labels in developing countries should be a priority.[16]

Limited research has been done since the implementation of the current labelling regulations to investigate nutrition labelling and the South African consumer. The majority of studies were conducted in the North West and Gauteng provinces with relatively small sample sizes,[27-30] with the exception of one national study conducted by Bosman et al. who investigated consumer use and opinions of nutrition information on food labels.[31] A more comprehensive investigation, in which quantitative and qualitative techniques are employed, could however be beneficial to add to the existing body of knowledge and to understand the complexity of consumer nutrition label knowledge and understanding within different demographic groups, whether consumers read the nutrition information on food labels, consumer expectations of nutrition labelling, and its impact on purchasing behaviour.

Research has shown that consumers from developed countries prefer more simplified food labels.[16] Simplified nutrition information on food labels in the form of different front-of-pack labelling symbols and nutrition rating systems has seen substantial growth over the past years. These symbols and systems have been developed by food manufacturers, retailers, health organizations, and others with the intention of helping consumers make healthier food choices. The symbols and systems can broadly be categorized into different groups, namely: 1) nutrient specific systems, 2) summary indicator systems and 3) food group information systems. Nutrient specific systems display the amount per serving of select nutrients from the nutrition information table or symbols based on claim criteria. The information is given in percent daily values or guideline daily amounts (%GDA) and may also include traffic-light colours or words to indicate a product contains ‘high’, ‘medium’ or ‘low’ amounts of specific nutrients. Examples of these systems include the United Kingdom (UK) traffic light system or Kellogg’s Nutrition at a glance. Summary indicator systems use a single symbol, icon or score to provide summary information about the nutrient content of a product. Examples of these systems include Canada’s health check, the United States (US) NuVal system and the Swedish green keyhole. Food group information systems use symbols awarded to a food product

based on the presence of a food group or food ingredient. An example of these systems include the Whole grain logo.[32] In the past five years, other approaches to front-of-package labelling in the form of 'interpretative' and warning labels have also gained popularity. In Australia and New Zealand the Health star rating (HSR) system was implemented in 2014, while the Chilean government implemented a system in 2016 where all foods exceeding specific limits for calories, saturated fat, sugar and sodium must include a black and white warning message inside a stop street on the front-of-package.[12]

Although there is an ongoing debate as to the best front-of-pack labelling approach, all these approaches aim to help consumers make healthier food choices and in turn address the global NCD burden. With the introduction of different front-of-pack labelling approaches in countries all around the world, and in light of the new draft SA labelling regulations with the inclusion of a nutrient profile model, the possibility of a front-of-pack labelling system for SA was identified. In 2013, the research team had a meeting with the Department of Health, Directorate: Food Control where different possibilities for research in the field of nutrition labelling and front-of-pack labelling approaches were discussed. During this meeting, the Department expressed the need for the development of a single health endorsement logo (HEL) for SA. Based on the discussion, the research team set forth to also investigate the need for a single HEL for SA and to develop and pilot test these logos.

SA is a country of severe contrasts, extending from industrialised cities and Westernised cultures to rural areas with traditional African lifestyles.[33] The nine provinces in SA differ significantly with regard to population size and ethnicity, literacy levels, language, and access to housing, electricity and sewage. The City of Cape Town, located in the Western Cape province of the country, is the second largest city in SA.[34] The city has a total population of approximately 3 740 026 people and consists of various ethnic groups, the majority being of mixed race (coloured). Approximately 80% of people in the city have a formal dwelling, while the majority have access to electricity and sewage. The unemployment rate is 24%, contributing to severe income inequality, while educational inequality remains a concern. The literacy level, however, is relatively high compared with the rest of the country, with only 10% of adults not having completed primary school.[35] Owing to its diverse population, Cape Town is an ideal setting for this research, as it includes consumers with different backgrounds, lifestyles, cultures and eating patterns.

1.2 Research questions

This study is guided by the following research questions:

- What is the knowledge of consumers regarding nutrition information on food labels and do consumers read this information when purchasing food products?
- What are the factors that influence consumer food purchasing?
- What are the expectations of consumers and their perceived barriers regarding nutrition information on food labels?
- Is a single HEL for products that are healthier choices based on the South African nutrient profile model acceptable to consumers, and what is an appropriate design of such a logo for the consumer?

1.3 Aims and objectives

1.3.1 Aims

- To perform a situation analysis of consumer knowledge and reading of the nutrition information on food labels in relation to various consumer characteristics.
- To explore the self-reported factors that influence the food-purchasing behaviour of consumers and to determine consumer expectations and perceived barriers regarding the nutrition information on food labels.
- To determine the acceptability and appropriate design of a single HEL for products that are healthier choices based on the South African nutrient profile model.

1.3.2 Objectives

- To determine consumer knowledge with regard to the nutrition information on food labels (phase one).
- To determine whether consumers read the nutrition information table, list of ingredients, and health and nutrient content claims (phase one).
- To assess any relationships between consumer knowledge and reading of the nutrition information on food labels and various consumer characteristics, including education level, income, age, gender, race and employment status (phase one).

- To explore the self-reported factors that influence food purchases of consumers (phase one and two).
- To explore why consumers read or ignore the nutrition information on food labels (phase one and two).
- To explore consumer expectations and perceived barriers of the nutrition information on food labels (phase one and two).
- To explore what types of HELs are preferred and why (phase one, two and three).
- To make recommendations to an independent logo design company for the design of HELs for products that are healthier food choices based on the South African nutrient profile model (phase three).
- To pilot field test the most suitable HELs among and to determine their acceptability and understanding (phase three).
- To recommend HELs to the Department of Health, Directorates: Nutrition, NCDs, Health Promotion and Food Control, SA, to consider for implementation after further testing (phase three).

1.4 Conceptual framework for addressing the research question

The conceptual framework shown in Figure 1.1 illustrates how the proposed research process addresses the research question and responds to the research objectives.

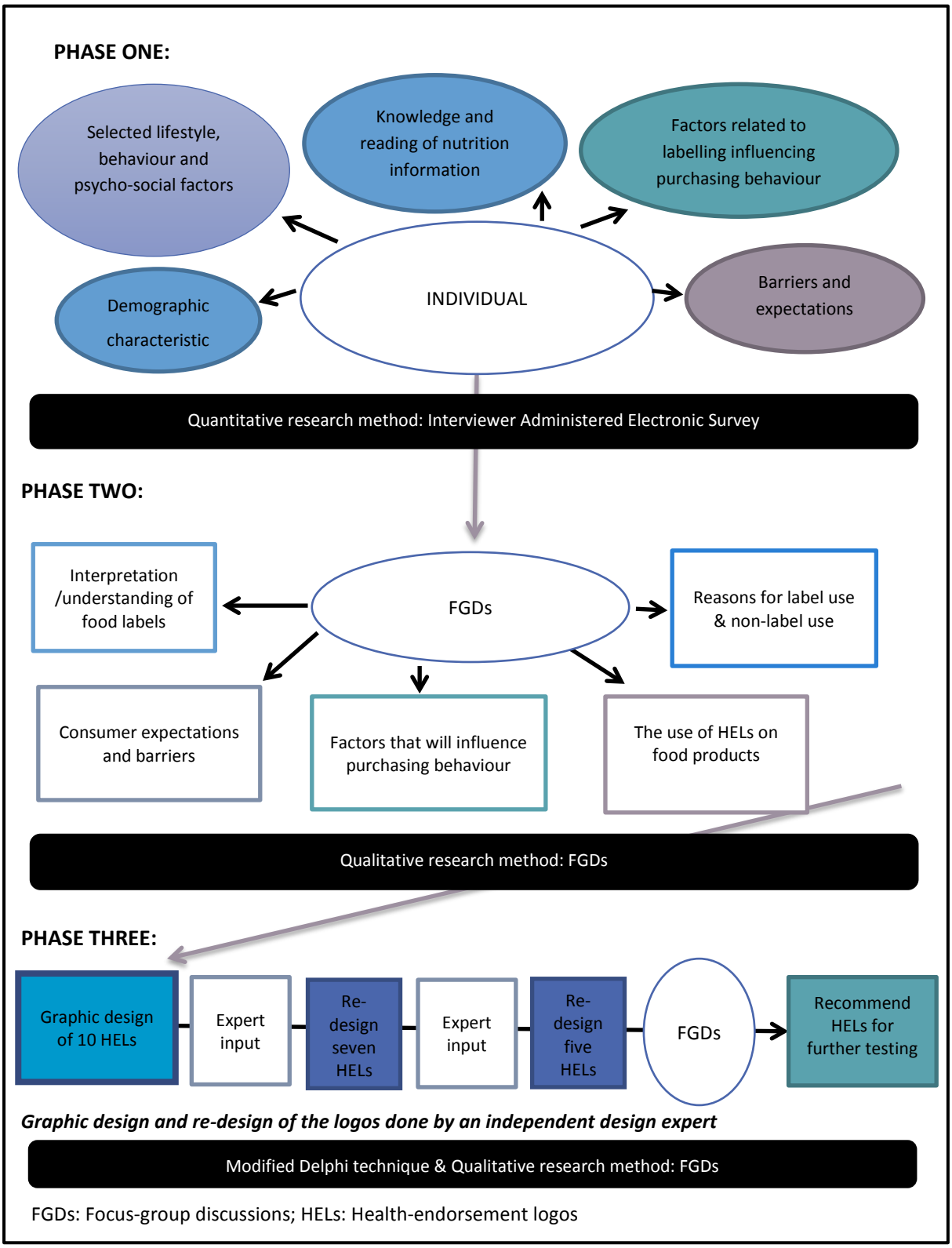

Figure 1.1: Conceptual framework of the research study

1.5 Outline of dissertation

This dissertation is presented in seven chapters commencing with this general introductory chapter.

A brief overview of each chapter is now given:

Chapter 1 includes a general introduction, research questions, aims and objectives, and a conceptual framework of the research study.

Chapter 2 includes a published overview of the literature in the form of a review article:

- Koen N, Blaauw R, Wentzel-Viljoen E. The influence of nutrition labelling and logos on food-purchasing behaviour in the City of Cape Town, Western Cape, South Africa. S Afr J Clin Nutr. 2016;29(3):10-21.

Chapter 3 includes a detailed description of the methodology for each phase of the study.

Chapters 4, 5 and 6 each focuses on the results of a particular phase of the research process; each chapter is presented in journal article format. Each article is written according to the author guidelines (with regard to style, formatting and referencing) of the selected journal. The titles of these three chapters are:

- Consumer knowledge and reading of nutrition information on food labels in South Africa: A cross-sectional descriptive study
- Price rather than nutrition information the main influencer of consumer purchasing behaviour in South Africa – A qualitative study
- The development of a single health-endorsement logo for South Africa

Chapter 7 contains a summary of the research design and a critical discussion of the main findings. It includes the limitations of the research, recommendations, and final conclusion.

Since the dissertation is presented in journal article format, each chapter contains a separate list of references.

1.6 Authors' contributions

The results of this research have been reported in four journal articles. Table 1.1 provides a summary of these articles and their authors.

Table 1.1: Article authorship

Article title:	**Authors (in order):**
Review Article: Food and nutrition labelling: The past, present and the way forward	N Koen R Blaauw E Wentzel-Viljoen
Consumer knowledge and reading of nutrition information on food labels in South Africa: A cross-sectional descriptive study	N Koen E Wentzel-Viljoen D Nel R Blaauw
Price rather than nutrition information the main influencer of consumer purchasing behaviour in South Africa – A qualitative study	N Koen E Wentzel-Viljoen R Blaauw
The development of a single health-endorsement logo for South Africa	N Koen E Wentzel-Viljoen R Blaauw

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Chapter 2

Literature Review

2.1 Introduction

A comprehensive literature overview on food and nutrition labelling, with a specific focus on the South African context, is presented in the form of a review article, published in March 2016, in the *South African Journal of Clinical Nutrition*.

2.2 Review article

Food and nutrition labelling: the past, present and the way forward

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Abstract

Current global mortality from noncommunicable diseases (NCDs) remains unacceptably high and is increasing. A major reduction in the burden of NCDs should come from population-wide interventions, including the promotion of a healthy diet through the provision of adequate nutrition information on food labels. However, in order for this type of intervention to be successful, it is important to have a better understanding of the consumer. This review focuses on the need for food and nutrition labelling (the section of information on a food label that specifically declares nutrient content) within the context of NCDs, as well as consumer nutrition label use, and understanding and the impact of nutrition labelling on purchasing behaviour. It provides a summary of the latest global nutrition labelling trends, the current situation in South Africa and the way forward. Consumer knowledge, use and understanding of nutrition labelling has been investigated extensively in the international literature. However, the majority of these investigations were conducted in developed countries. Therefore, additional research on the impact of nutrition labelling in developing countries is necessary, and should be a priority. There have been many developments in South Africa in terms of food and nutrition labelling in the last decade. Although the food industry, health professionals and consumers face many changes, challenges and opportunities with regard to food, and specifically to nutrition labelling, this is also the ideal time to promote the use and understanding of nutrition information on labels by health professionals to consumers.

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Introduction

The primary role of food labels is to inform consumers and aid in selling the product. However, the information conveyed by food labels has evolved over time. In the past few years, the objectives of food labelling have become numerous and complex under the influence of food legislation, food companies, retailers, public authorities and the consumer.[1]

According to the World Health Organization (WHO), food labelling includes "any written, printed or graphic matter that is present on the label, accompanies the food, or is displayed near the food, including that for the purpose of promoting its sale or disposal".[2] The South African regulations relating to labelling and advertising of foodstuffs (R146) also define a label as "any tag, brand, mark, pictorial, graphic or other descriptive matter, which is written, printed, stencilled, marked, embossed, impressed upon, or permanently attached to a container of a foodstuff, and includes labelling for the purpose of promoting its sale or disposal".[3]

In general, food labels inform consumers about the composition and nature of products to avoid confusion and protect the consumer against misuse, risk and abuse. Marketing information, including the selling price, brand name and commercial offers, is provided as well as information on the safe storage, preparation and handling of the food product.[1,4] Information on ingredients, nutrition and the declaration of potential allergens and nutrition and/or health claims, helps consumers to make an informed decision. There has been an emphasis in recent years on food safety and the protection of the health of the consumer as one of the main objectives of food legislation.[1]

Nutrition labelling is the section of information on a food label that specifically declares nutrient content.[5] According to the *Codex Alimentarius,* nutrition labelling is effective when it provides the consumer with information about a food to help him or her to make healthy food choices.[6] According to Bovell-Benjamin and Bromfield, it should also create a food selection environment which is more conducive to healthy choices.[5]

Nutrition labelling is considered a population-based approach,[5] and if well designed, can potentially have a positive influence on the diet of consumers,[7] and therefore contribute to the achievement of public health objectives.[2] Although consumers gather information about food from a variety of sources, including their families, education and the media, the food and nutrition label can provide the consumer with invaluable information at the point of purchase. Therefore, nutrition labelling also provides healthcare professionals with an opportunity

to educate clients on nutrition, and how to utilise this information to make healthier food choices.

The need for food and nutrition labelling within the context of noncommunicable diseases

According to the WHO global status report on noncommunicable diseases (NCDs), NCDs are the leading causes of death globally, killing more people each year than all other causes combined.[8] Even though infectious diseases and undernutrition dominate the current disease burden in the poorest countries, the major risk factors for chronic diseases are spreading.[9] Nearly 80% of NCD deaths occur in low- and middle-income countries.[8] NCD deaths are projected to increase by 15% globally between 2010 and 2020. The greatest increases will be in south-east Asia, the eastern Mediterranean and Africa, where NCDs will increase by over 20%.[10] NCDs are projected to surpass communicable, perinatal and nutritional diseases as the most common cause of death by 2030 in African nations.[8]

In terms of attributable deaths, raised blood pressure (13% of global deaths) is the leading NCD risk factor globally, followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%) and overweight and obesity (5%).[10] In South Africa, in 2010, the three risk factors which accounted for the most disease were alcohol use, high body mass index and raised blood pressure.[11]

Worldwide, the prevalence of overweight and obesity is increasing at an alarming rate. Globally, at least 2.8 million people die each year as a result of being overweight or obese.[12] In addition, 44% of the diabetes mellitus burden, 23% of the ischaemic heart disease burden and between 7% and 41% of the cancer burden is attributable to overweight and obesity. Overweight and obesity are now on the rise in low- and middle-income countries, particularly in urban settings.[13]

The economic consequences of NCDs are also increasing. If NCD rates continue to increase as populations age and grow, and intervention efforts remain static, cumulative economic losses to low- and middle-income countries are estimated to surpass US$7 trillion over the period 2011-2025.[14]

South Africa is bearing a quadruple burden of disease as a result of infectious diseases linked to poverty and undernutrition, the effect of the human immunodeficiency virus/acquired immune deficiency syndrome epidemic, the increasing number of injury-related deaths, chronic diseases associated with overnutrition and the adoption of a Western diet.[15] South Africa's population consist of a wide variety of different cultural and ethnic groups, as well as a variety of education and income levels. The income difference is also revealed in the dietary intake of the population as the nutritional status of South Africans ranges from stunting to overweight and obesity. As people from rural areas move into urban areas (the nutrition transition), there is a considerable change in lifestyle, including decreased physical activity, increased consumption of fast foods, and an increase in the use of alcohol and tobacco products.[16]

It was found following a recent review of dietary surveys in the adult South Africa population from 2000-2015 that urban Africans in KwaZulu-Natal and North West province have a higher percentage energy intake from fat and added sugar than their rural counterparts, while South Africans in general have a very low fruit and vegetable intake.[17] Results from the Prospective Urban and Rural Epidemiological (PURE) study in North West province also indicated that urban South Africans have a higher intake of micronutrients than those living in rural areas, with a substantial percentage of people not meeting the dietary reference intakes (DRIs).[18,19] It was also found in this study that added sugar intake, particularly in rural areas, has increased rapidly over the past five years.[20] Large quantities of staple foods (maize and bread) are consumed by South Africans on a daily basis. Staple foods cost less per unit of energy than fruit, vegetables and animal byproducts,[21,22] and they are the preferred food choices of many people in poorer communities. Foods that supply energy at low cost are the most practical way for low-income individuals to meet their energy requirements as these foods are often those that also have a high energy density and satiety value.[22] With the overconsumption of staple foods, dietary fat, added sugar and a low micronutrient intake, South Africans are at great risk of NCDs.[17,20]

In 2008, 59% of men and 72% of women were overweight in South Africa, while 21% of males and 41% of females were obese. Thirty-five per cent of South African male adults and 32% of females aged ≥ 25 years suffered from high blood pressure.[23]

According to the South African National Health and Nutrition Examination Survey (SANHANES-I), published in 2014 (second edition), 23% of participants in the survey, aged ≥ 15 years had high serum total and low-density lipoprotein cholesterol (29%), while 48% had an abnormally low high-density lipoprotein cholesterol. Diabetes was diagnosed in 10% of the participants.[24] Overall, South African females had a mean body mass index (BMI) of 29 kg/m^2, which was significantly higher than that of the males (24 kg/m^2). The prevalence of overweight and obesity was significantly lower in males (20% and 11%) than in females (25% and 39%). It was also found in the survey that one in five males (20%), and more than two thirds (68%) of females, had a waist circumference that placed them at risk of metabolic complications. Similar results were reported with regard to a raised waist hip ratio (7% for males and 47% for females). When compared to the 2003 South African Demographic and Health Survey (SADHS), the SANHANES-I survey showed that obesity increased substantially in females, from 27% in 2003 to 39% in 2012.[24]

The WHO global status report on NCDs states that the epidemic of NCDs can be reversed through modest investment. Some effective approaches can be so low in cost that country income levels may not be a major barrier to successful prevention. However, good planning, high levels of commitment from government, community mobilisation and a strong focus on a small range of critical actions is crucial.[8] The WHO has identified a set of evidence-based "best buy" interventions which are cost-effective, and also feasible and appropriate to implement within the constraints of local low- and middle-income countries' health systems.[14] Individual-based "best buy" interventions are delivered in primary healthcare settings, and include counselling and drug therapy for persons with or at high risk of cardiovascular disease, and hepatitis B immunisation to prevent liver cancer. Population-based "best buy" interventions address tobacco and harmful alcohol use, as well as an unhealthy diet and physical inactivity. Examples in this regard include tax increases for

tobacco products and alcohol, smoke-free indoor workplaces, health information and warnings thereon, bans on advertising, restricted access to retail alcohol, reduced salt content in food, the replacement of trans fat with polyunsaturated fat, and public awareness through mass media on diet and physical activity.[25] With regard to raising awareness and promoting healthy diets, the WHO also recommends actions to provide adequate nutrition information through food labelling to help consumers make the right food choices.[8]

In South Africa, the *Strategic plan for the prevention and control of non-communicable diseases, 2013-2017,* was compiled to reach the targets set at the South African summit on the prevention and control of NCDs in September 2011. The summit accepted key principles for reducing NCDs through a declaration which was adopted by everyone present. Ten targets were set, to be reached by 2020. According to the strategic plan, the realisation of the overall health sector goal of "a long and healthy life for all" through the prevention and control of NCDs can be achieved with the implementation of three major components:

- The prevention of NCDs and the promotion of health and wellness at population, community and individual level.
- Improved control of NCDs through health system strengthening and reform.
- Monitoring NCDs and their key risk factors, and carrying out innovative research.[26]

Food labelling is considered to be a valuable and relatively low-cost tool to assist in reaching the goal of preventing NCDs and promoting health and wellness for all people (component 1).

Food and nutrition labelling

Nutrition label use and understanding: the consumer

There is a large and growing evidence base on nutrition labels, including numerous literature reviews which have been conducted on the topic of nutrition label use since 1991.[27] Generally, the findings have been consistent, with the self-reported use of nutrition labels being prevalent. However, consumers have indicated that they struggle to interpret quantitative information contained in labels, while some found different nutrition label formats, as well as too much information provided on the label, confusing. It was also found that consumers generally preferred graphical information, such as a logo, to the traditional nutrition information table.[28-33]

In a recent systematic review by Campos et al,[27] which included 120 articles, it was found that nutrition labels were perceived as a very credible source of nutrition information, and that many consumers use nutrition labels as a guide in the selection of food products. However, the use of nutrition labels varies considerably across different subgroups. Middle-aged or younger adults are more likely to use nutrition labels, while women reported using nutritional labels significantly more often than men. Individuals from lower-income groups are less likely to use nutrition labels, while it was also found that the Caucasian participants are more likely to use nutrition labels than any other ethnic group. Evidence shows a consistent link between the use of nutrition labels and healthier diets. It was also found in this systematic review that consumers tended to struggle with nutrition label understanding, and expressed a desire for the information to be presented more simply. There is contradictory evidence with respect to the ease or difficulty of using nutrition labels. Those using nutrition labels more frequently, younger consumers, and those with higher education, income, literacy and numeracy, reported a better understanding of nutrition labels. It is important to note that the research studies included in this review were mostly from high-income Western countries, and the authors recommended that additional research on the impact of nutrition labels in low- and middle income countries should be "considered a priority".[27]

Nutrition label use and understanding: the South African consumer

In South Africa, studies investigating the use and/or understanding of food labels in Gauteng and the North West provinces, as well as one national study conducted by Bosman et al, found that consumers were mostly positive about food labels as an information source.[4,34,35] However, it was found in a recent survey conducted by Van der Colff et al in Gauteng that the 279 consumers included in this study were generally dissatisfied with label attributes, including the believability, readability, comprehensibility and adequacy of food labels, as well as the primary information provided on the label. This included the expiry date, allergens, nutrition and health information, the ingredient list and quality guarantees.[36]

Bosman et al[35] conducted an investigation into nutrition labelling in South Africa, and this was the largest study to date since the publication of regulations relating to the labelling and advertising of foodstuffs (R146/2010). The study was conducted in nine metropolitan areas of South Africa on 1997 consumers by means of an interviewer-administered survey consisting of demographic information and 21 Likert scales on consumer use and opinions of nutrition information on food labels. The study was part of a larger project and was representative of both genders and the four main ethnic groups within the South African population.[35]

South African consumers read nutrition information on food labels to some extent, and were able to locate it.[34] However, some indicated that they were unsure of their understanding of the information provided.[37,38] Other difficulties experienced by consumers when using nutrition labels included the font size of the nutrition information, as well as the terminology used in the ingredients' list.[38] Therefore, it seems that with the proper education of consumers by health professionals and educational programmes on the importance of nutrition labelling, as well as the reading and understanding of food labels, consumers may be more willing and capable of making healthier food choices. Consumers who indicated that they did not read labels identified a lack of interest, time, price concerns[35] and habitual purchasing[37] as the main reasons. Some consumers have also indicated that they regard the taste of a product as being more important than its nutritional content.[38] This emphasises the need to educate consumers on how to make healthier food choices, while utilising the information provided on the food label, but within the boundaries of the aforementioned factors, e.g. educating consumers on how to compare the nutrition information provided on food labels, but for products within a specific price range.

The impact of nutrition labels on diet and health behaviour

An association between the use of nutrition labels and a healthy diet has been found in several studies. Those who use labels were found to be more likely to eat healthier foods, to have a reduced fat,[39-42] sodium,[43] cholesterol[44] and energy intake, and an increased fibre, iron[45] and vitamin C intake.[39]

It was found in a longitudinal study conducted in the USA on the effect of the 1990 Nutrition Labelling and Education Act, which came into effect in 1994, that frequent nutrition label users in 1995 had a significantly greater probability of consuming a low-fat diet than both non-label users in 1995 and frequent label users in 1989.[46] A second study on the implementation of this Act found that the BMI of nutrition label users fell significantly following implementation of the Act.[47]

The association between label use and health practices has also been studied. The literature shows that individuals with healthier eating habits use nutrition labels more often than those that do not.[48-51] Regular exercise, supplement use and not smoking (i.e. health behaviour that does not directly relate to nutrition) have been associated with the use of nutrition labels.[48,52-54]

The significance of food labelling during consumer decision-making

In general, food purchases are regarded as routine purchase decisions which require little involvement and an external search for information. But, contrary to other types of purchases, consumers often have to choose several items within a very short period during food purchasing. Some are more involved in the task of food purchasing (for whatever reason), and become more involved in the selection of products. These consumers usually pay more attention to label information. Consumers also tend to study the labels of food products with more complex nutritional composition more carefully than products with which they are more familiar, or which they find easy to interpret. Therefore, food purchasing can become demanding.[55]

Consumers behave and make decisions in different ways for different reasons.[56] A complex combination of external and internal factors influences consumers' food product-related needs. These include various demographic characteristics of the consumer, such as age, gender, education level, race, ethnicity, income, work status, and product knowledge, needs, personality, hunger and marketing-related influences.[27,55]

Food labels are particularly important when addressing consumers' needs, while food packaging, which often integrates labelling information as part of the container,[55] can influence consumer purchasing behaviour as these elements, including package colour, image, typeface and type of packaging, can generate an emotional response in consumers.[57] Bright colours, puzzles, games and cartoon characters used on packaging material may appeal specifically to children, and can influence product choice, intake, as well as the child's rating of the taste of a specific food product.[58-60]

Jacobs et al developed a conceptual framework of consumers' understanding and the use of information on food labels by combining information from various sources (Figure 1). A good overview of the decision-making process, as well as the internal and external influences which directly affect consumers' understanding and use of food label information, and their ability to make informed food choices, are provided by this framework.[38]

Different approaches to nutrition labelling

Four main approaches to front-of-pack nutrition labelling were identified following a review of front-of-pack labelling schemes conducted for the European Heart Network by Stockley et al. This information related to labelling schemes from France, Germany, Italy,

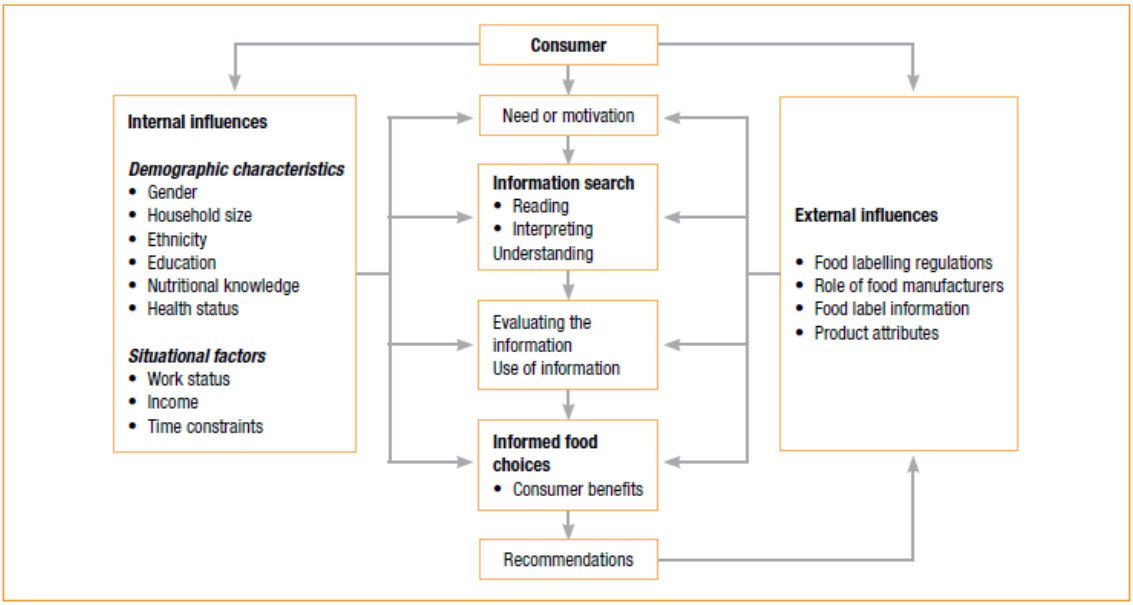


Figure 1: A conceptual framework of consumers' understanding and use of the information on food labels[38]

Netherlands, New Zealand, Norway, Slovenia, the UK, South Africa and the USA:[61]

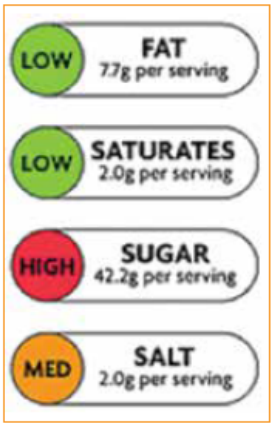
- Single healthy eating symbols (health logos or health endorsement logos) to indicate which foods are healthier. Examples of these include the Swedish green keyhole, heart symbol of the Heart and Stroke Foundation South Africa, Smart Choices logo (developed in the USA, but currently not in use) and the Choice logos from the Netherlands (Figures 2-5).
- Traffic light labelling of nutrients where red, amber and green are used to indicate the levels of key nutrients (Figure 6).
- A hybrid of traffic lights and percentage guideline daily amounts (GDAs) which provides information on the GDA percentages and superimposes traffic light colour onto these (Figure 7).[61]
- Percent GDAs where the percentages of the GDA for key nutrients in a serving/portion or 100g of food is given (Figure 8)

Figure 2: Swedish Green keyhole

Figure 3: Heart symbol

Figure 4: Smart Choices logo

Figure 5: Choices logo



Med: medium

Figure 6: Example of a traffic light label

Med: medium

Figure 7: Example of a hybrid of traffic lights and percentage of guideline daily amount

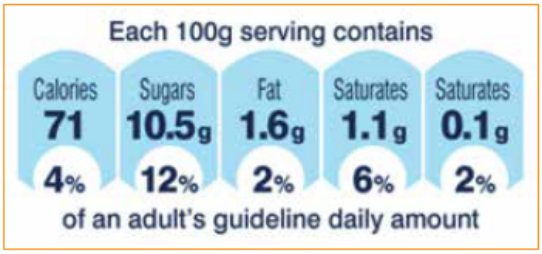


Figure 8: Example of a guideline daily amount label, given per 100 g

There is an ongoing debate as to the best front-of-pack labelling approach. The evidence suggests that various labelling schemes and different presentations on food products may cause confusion in consumers.[62] Health endorsement logos are considered one potential labelling scheme, and are often underpinned by different approaches to nutrient profiling. These logos appear on foods considered to be healthy, and do not contain numerical values for nutrients since the presence of the logo itself indicates that a product meets the underlying nutrition criteria set by the organisation responsible for the logo scheme.[63] Examples of these types of logos include the Swedish green keyhole,[64] the Smart Choices logo,[65] and the Choices logos.[66] These schemes evaluate both the risk and positive nutrients to determine whether or not the product is deemed healthy in relation to other foods.[63] Examples of health-endorsement logos currently being used in South Africa include the Heart and Stroke Foundation South Africa, Weigh-less, the Glycaemic Index Foundation South Africa and Diabetes South Africa logos. It states in the regulations pertaining to the labelling and advertising of foodstuffs (R146/2010) that only pictorial presentations, marks and logos approved by the Director-General of the Department of Health will be allowed, and in instances where the organisation, association or foundation can provide proof that it is involved in generic health promotion supported by evidence-based nutrition.[3]

Greater effectiveness of labels using graphics, symbols and logos, compared with more traditional nutrition labels which feature quantitative information, has been shown in several studies. Consumers have indicated that they prefer this type of format as it simplifies the nutrition information, although consumers differ in their liking of the various formats.[67,68] Well recognised health endorsement logos may be particularly effective. In general, simplified labels have been shown to promote more accurate nutrition judgements.[27] It was found in a study conducted by Bialkova and Van Trijp that consumers preferred logos when they were present (instead of absent), doubled in size, as well as displayed at the top right of the package. The researchers also found that consumers preferred a single location for the logo on all products.[69]

The Choices programme from the Netherlands is an example of a successfully implemented labelling scheme that uses health-endorsement logos. The programme is a unique multi-stakeholder initiative designed to help consumers to select healthy food options, and to help the food industry to improve its products. It was introduced in the Netherlands in 2006 as a response to the WHO call for the food industry to take an active role in helping to address the growing problem of obesity and diet-related diseases.[66] After the development and implementation of the logo, a mass media campaign was launched to communicate the meaning of the logo to the public. By increasing the visibility of the logo, and through communication campaigns implemented during the first year after the logo was introduced, more than 80% of the population was familiar with the logo after one year of introduction, compared to approximately 30% at the beginning.[70]

However, critics of health-endorsement logos based on specific criteria have argued that the logo may mask relatively high levels of risk nutrients, such as sugar (by fortifying products with positive nutrients, such as fibre) in order to qualify for a logo if the criteria are weak, and not based on the dietary guidelines of that particular country.[71] For example, in the USA, products such as Fruit Loops® and Cocoa Puffs® bore the Smart Choices logo as they met the specified criteria, thus implying that these were healthy foods.

In addition, Andrews et al concluded that health-endorsement logos may be acting as implicit health claims, and lead to a higher subjective evaluation of product healthfulness when compared to the European traffic light logo, or when no logo is present.[72] Feunekes et al also found that the traffic light logo was rated higher than a health-endorsement logo scheme for liking, comprehension and credibility.[73]

Irrespective of which labelling system is favoured (a health-endorsement logo, table, picture or a combination thereof), it has been reported that in order for front-of-pack labelling to be effective and for consumer confusion to be avoided, a single, credible, reliable front-of package nutrition labelling system adopted by food manufacturers and retailers would assist consumers in making smarter food and beverage choices at a glance.[65]

Global nutrition labelling trends

In recent years, the global trend has been a move toward mandatory nutrition labelling, regardless of whether or not a health and/or nutrition claim is made. To reflect this trend, the *Codex Alimentarius* guidelines were adapted in 2012 to recommend that nutrition labelling should be mandatory, even in the absence of health claims. Countries can be grouped into two categories based on their statutory regulations with regard to nutrition labelling (Table I).[74]

According to the European Food Information Council, apart from the mandatory nutrition labelling trend, the standardisation of front-of-pack labels is another global trend. Countries, such as Thailand, have already introduced mandatory front-of-pack labels, while others, i.e. Australia, New Zealand and the USA, are considering it.[74] Currently, front-of-pack labels are not mandatory or standardised in South Africa. However, the new proposed South African labelling regulations, i.e. *Regulations relating to the labelling and advertising of foods: Amendment (No R 429)*, include a section on front-of-pack labelling which states that such labelling should be considered as voluntary information, but when front-of-pack information is included on a label, it should comply with certain conditions.[75]

Table I: Overview of mandatory and voluntary nutrition labelling[74]

Mandatory	Voluntary
Countries where nutrition labelling is mandatory, even in the absence of a nutrition or health claim	Countries that provide state-sponsored guidelines to be followed voluntarily. Nutrition labelling is not mandatory unless a health or nutrition claim is made, or unless the food is for special dietary uses
• Argentina • Australia • Brazil • Canada • Chile • China • Columbia • Ecuador • European Union member states • Hong Kong • India • Indonesia • Israel • Malaysia • Mexico • New Zealand • Paraguay • South Korea • Taiwan • United States • Uruguay	• Gulf Cooperation Council countries • Japan • Kenya • Mauritius • Nigeria • Philippines • Singapore • South Africa • Thailand • Turkey • Venezuela

Food and nutrition labelling in South Africa

Since the 1990s, there's been a growing need in South Africa for more up-to-date food labelling legislation to better protect and inform the consumer, and to align with new, emerging scientific nutrition-related research, new trends, and international standards and guidelines, including the *Codex Alimentarius*.[76]

The Department of Health, Directorate: Food Control is responsible for ensuring the safety of food in South Africa. The main functions of the Food Control body include administering food legislation, including the development and publicising of regulations for food labelling, as well as "informing, educating and communicating to industry, consumers, the media, government departments and other stakeholders about food safety and related matters".[77]

In March 2010, the Regulations relating to the labelling and advertising of foodstuffs (R146/2010) were published in the *Government Gazette* by the Department of Health, Directorate: Food Control after two drafts were published for comments in 2002 and 2007.[3] The intention of the new legislation was to close known loopholes which might allow misleading foodstuff labelling and advertising, and to ensure that consumers had access to honest, accurate foodstuff labels. The promotion of healthier eating habits through improved labelling and advertising was one of the key objectives behind these regulations, thereby encouraging better food choices in order to improve public health.[78]

The regulations came into effect two years after publication on 1 March 2012.[76] They were intended to act as interim legislation pending the adoption of more comprehensive labelling legislation at a later stage, and included general and special provisions (with regulations on ingredients, allergens, negative claims and prohibited statements); nutritional information (with regulations on serving sizes and the nutrition information table), as well as nutrient content and comparative claims.[3] Since 2010, amendments to R146 were published in the *Government Gazette* in November 2010 and January 2012.[79,80]

In May 2014, Regulations relating to the labelling and advertising of foods: Amendment (No R 429) was published in the Government Gazette for comment.[75] The new regulations include important proposed changes to the current regulations (No R.146), for example mandatory nutritional information labelling, as well as, amongst other topics, regulations on health claims such as glycaemic index (GI) category and glycaemic load claims, function claims, reduction of disease risk claims, and slimming/weight loss claims based on nutrient profiling. The new proposed regulations also include a section on the commercial marketing of foods and non-alcoholic beverages to children. According to these guidelines, unhealthy food may not be marketed to schoolchildren from grade 0-12, while child actors aged ≤ 18 years, using celebrities or sport stars, cartoon characters, puppets, or any form of computer animation, and the use of competitions, gifts or collectable items, may also not be used to market unhealthy foods to children.[75]

The introduction of nutrient profiling into the labelling regulations

Many comments were received on the draft Regulations governing the advertising and labelling of foodstuffs (R 642/2007). Annexure 6 of the regulation: "Foodstuffs not considered essential for a healthy diet, and for which no nutrient content, glycaemic index, certain comparative, health, slimming or any other claim with a health or nutritional message will be permitted" was commented on by food industry, as well as the scientific community. From the comments received, it was argued that this section should be based on good scientific evidence. Therefore, a nutrient profiling system applicable to all categories of food was proposed. The aim of using a nutrient profiling model as a criteria for making health claims was to avoid a situation whereby the health or nutrition claim on a product could mask the overall undesirable nutritional impact of the product based on its total composition.[81]

According to Rayner et al, nutrient profiling is "the science of categorising foods according to their nutritional composition",[82] while Tetens et al define it as the "categorisation of foods for specific purposes on the basis of their nutrient composition according to scientific principles".[83] Nutrient profiling can be used for different applications, including marketing foods to children, health and nutrition claims, product labelling logos or symbols, information and education, the provision of food to public institutions, as well as the use of economic tools to orient food consumption.[84] The ultimate aim of the model is to help consumers make healthier food choices and to have a "healthier" diet. This should eventually lead to a measurable improvement in the public health diet-related prevalence of NCDs in the country in which it is implemented.[83,85]

A report by Wentzel-Viljoen et al, titled Report: Evaluation of existing nutrient profiling models, recommended that the Australian and New Zealand nutrient profiling model [Food Standards Australia New Zealand (FSANZ)] should be used to determine the eligibility of food items in South Africa to carry any nutrient and/or health claim. In 2012, the recommended model was validated using five different validation approaches. In 2012, the recommended model was validated using five different validation approaches. Based on the evidence and evaluations done, the use of a slightly modified version of the FSANZ model (released in 2012) is recommended to be used in South Africa as the screening tool to assess if a food product is eligible to carry a nutrient and/or health claim.[78]

The FSANZ model is based on the nutritional value per 100 g of food, and three categories are used (Table II). Baseline points are calculated based on the cut-off points provided for energy, saturated fat, added sugar and sodium. Modifying points are calculated after taking into consideration certain conditions, for example, the fruit, vegetable, nut and legume content of the food item, and its fibre and protein content. The final score for a food item is calculated by subtracting the modifying points from the baseline points.[78] A nutrient profile calculator is available on the website of the Department of Health, South Africa at http://www.health.gov.za/phocadownload/FoodInfor/NPC_NWU.html

For example, if the number of points are calculated for a common brand of low-fat milk (Category 1) using the nutrient profile calculator provided on the Department of Health website, the following information is recorded: average energy content per 100 g; total sugars per 100 g, saturated fatty acids per 100 g, and sodium per 100 g. These values determine the baseline points for the product. The particular low-fat milk used in this example received a baseline score of 1. Information on protein per 100 g and fibre per 100 g is recorded to determine the number of modifying points. The low-fat milk in this example received a score of 2. When subtracting the modifying points (2) from the baseline points (1), this product received a final score of –1. Therefore, this food item is eligible with respect to making a health and/or nutrition claim. Thus, low-fat milk passes the screening test.

Table II: Categories and the scoring of food items according to the Food Standards Australia New Zealand model[86]

Food items	Category 1	Category 2	Category 3
	Beverages, excluding breast milk	Any food other than those included in Category 1 and 3	Cheese and processed cheese with a calcium content of ≥ 320 mg/100 g, edible oil, edible oil spreads, and margarine and butter
Final score	≤ 1, for food items to be eligible	≤ 4, for food items to be eligible	≤ 28, for food items to be eligible

The way forward

Current global mortality from NCDs remains unacceptably high, and is on the increase. NCDs account for an estimated 43% of all deaths in South Africa.[23]

A population-wide intervention, such as the promotion of a healthy diet through the provision of adequate nutrition information on food labels, as well as the education of consumers to better understand a nutrition label, is crucial in helping to address the NCD dilemma in South Africa. However, this type of intervention, together with other interventions aimed at addressing the NCD burden, can only be successful with commitment from government by way of appropriate policies, education campaigns and the necessary resources.

Nutrition information, including the nutrition information table, list of ingredients, claims and logos, can help consumers to make healthy food choices. However, it is important to have a better understanding of the South African consumer and his or her nutrition label knowledge and understanding, the use or non-use of nutrition labels, and factors which influence purchasing behaviour, in order to plan these interventions successfully.

Consumer knowledge, and the use and understanding of nutrition labelling, has been extensively investigated in the international literature. However, the majority of these investigations were conducted in developed countries. Therefore, additional research on the impact of nutrition labels in developing countries is necessary and should be a priority.[27] South Africa, with an estimated 55 million citizens in June 2015,[87] has a unique, diverse population with different cultural backgrounds, and with income inequality differing with respect to needs, households, consumption, environmental backgrounds, languages and ethnicity, and consequently, also behaviour.[88]

Since the implementation of the new food labelling regulations in March 2012, research has been carried out to determine whether consumers in South Africa use and understand nutrition labels. A few exploratory studies, in which relatively small samples were used,[4,37,38] have been conducted in the past few years. They all recommended that research on the topic should be conducted on a larger scale. Bosman et al conducted a national study to determine consumers' use and opinions on nutrition labelling.[35] However, a comprehensive investigation, in which quantitative and qualitative techniques are employed, is necessary to fully understand the complexity of nutrition label knowledge, its use and understanding within different socio-economic and ethnic groups, and its impact on purchasing behaviour. Reasons for non-label use, as well as factors that may influence those that do not read label information to purchase more healthy food products should also be explored. This is necessary in order to make useful recommendations to improve the nutrition labelling of food products and nutrition labelling strategies.

The food industry, health professionals and consumers anxiously await the outcome of the new proposed amendments to the regulations which relate to the labelling and advertising of foods in South Africa. Many changes, challenges and opportunities in food labelling, and specifically nutrition labelling, are expected. However, this is an ideal time in which to promote the use and education of nutrition labels by health professionals to consumers. It is also necessary to actively partake in research on how to use the information provided to the consumer in order to assist him or her to make healthier food choices.

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Chapter 3

Methodology

3.1 Introduction

The research study was conducted in three phases (as shown in Figure 1.1) and the methodology for each phase is discussed in this chapter. The following sections are covered: research question; research setting; aims and objectives (these sections are repeated for ease of reading) and overall study plan, phase one to three; ethics and legal aspects; and data analysis.

3.2 Research questions

- What is the knowledge of consumers regarding nutrition information on food labels and do consumers read this information when purchasing food products?
- What are the factors that influence consumer food purchasing?
- What are the expectations of consumers and their perceived barriers regarding nutrition information on food labels?
- Is a single HEL for products that are healthier choices based on the South African nutrient profile model acceptable to consumers, and what is an appropriate design of such a logo for the consumer?

3.3 Research setting

The study was conducted on adult consumers residing in the Eastern, Northern, Southern and Western health districts of Cape Town, Western Cape, SA.

3.4 Aims

- To perform a situation analysis of consumer knowledge and reading of the nutrition information on food labels in relation to various consumer characteristics.
- To explore the self-reported factors that influence the food-purchasing behaviour of consumers and to determine consumer expectations and perceived barriers regarding the nutrition information on food labels.
- To determine the acceptability and appropriate design of a single HEL for products that are healthier choices based on the South African nutrient profile model.

3.5 Objectives

- To determine consumer knowledge with regard to the nutrition information on food labels (phase one).
- To determine whether consumers read the nutrition information table, list of ingredients, and health and nutrient content claims (phase one).
- To assess any relationships between consumer knowledge and reading of the nutrition information on food labels and various consumer characteristics, including education level, income, age, gender, race and employment status (phase one).
- To explore the self-reported factors that influence food purchases of consumers (phase one and two).
- To explore the reasons why consumers read or ignore the nutrition information on food labels (phase one and two).
- To explore consumer expectations and perceived barriers of the nutrition information on food labels (phase one and two).
- To explore what type of HELs are preferred and why (phase one, two and three).
- To make recommendations to an independent logo design company for the design of HELs for products that are healthier food choices based on the South African nutrient profile model (phase three).
- To pilot field test the most suitable HELs among and to determine their acceptability and understanding (phase three).
- To recommend HELs to the Department of Health, SA, to consider for implementation after further testing (phase three).

3.6 Study plan

3.6.1 Study domain

The study domain is both in the qualitative and quantitative domains.

3.6.2 Study design overview

A multi-stage mixed-methods approach was employed. The purpose of such a design is "to obtain different but complementary data on the same topic".[1] Mixed-methods research is

increasingly recognised as valuable because it can potentially capitalise on the respective strengths of quantitative and qualitative approaches[2] and help to highlight the similarities and differences between particular aspects of a phenomenon.[3] In 1989, Greene et al. identified five broad rationales of mixed-methods studies:

a) Triangulation (seeking convergence and corroboration of results from different methods).

b) Complementarity (seeking elaboration, enhancement, illustration, clarification of results from one method with results from another).

c) Development (using the results from one method to help inform the other method).

d) Initiation (i.e., discovering paradoxes and contradictions that lead to a reframing of the research question).

e) Expansion (i.e., seeking to expand the breadth and range of inquiry by using different methods for different inquiry components).[4]

Owing to the complexity of what drives consumer behaviour, decision making and preferences, it was proposed, in planning the research, that a mixed-methods approach was the only suitable methodology to address the aims and objectives of the study. Consumers behave and make decisions in different ways for different reasons.[5] An intricate combination of external and internal factors can influence and even instigate consumers' food product-related needs.[6, 7]

A mixed-methods approach allowed the researcher to investigate consumer knowledge and reading of the nutrition information on food labels and to further explore, based on these findings, factors that influence purchasing behaviour, barriers to reading nutrition information on food labels, and consumer expectations. (Mixed-methods rationale: triangulation and complementarity.)

Furthermore, information obtained using quantitative and qualitative methods allowed the researcher to determine the need for HELs, make recommendations for the development of HELs, and to test these logos using qualitative methods. (Rationale: development.)

The nature of the study design, as applied in this study, is represented in Figure 3.1.

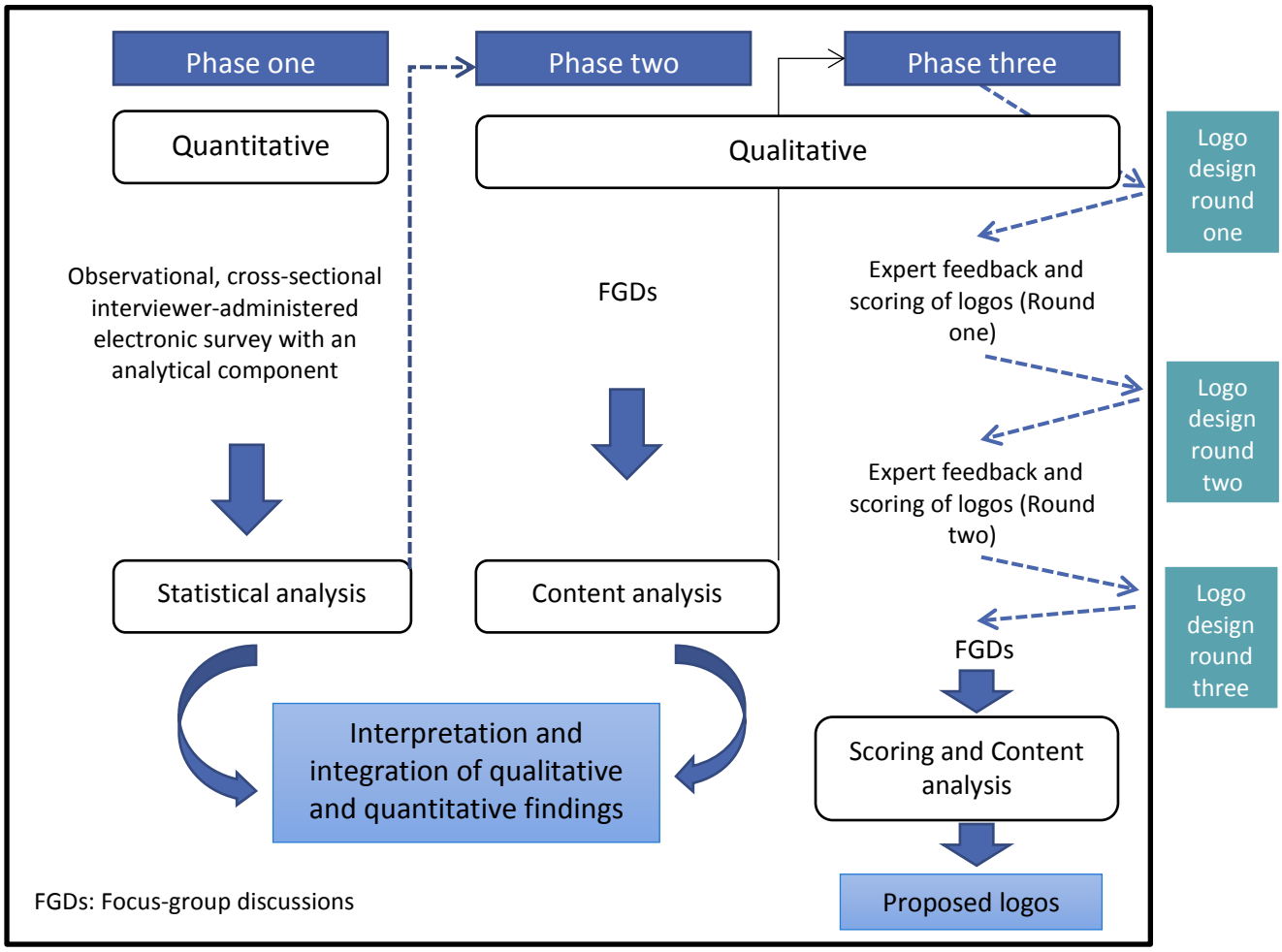


Figure 3.1: Mixed-methods design

The methodology for each phase of the research is discussed separately below.

3.7 Phase one: A situation analysis of consumer knowledge and reading of the nutrition information on food labels, in relation to various consumer characteristics

3.7.1 Rationale for using a quantitative approach

For phase one of the research, a quantitative approach in the form of a cross-sectional descriptive survey was used. Descriptive research sets out to quantify the extent of a problem. It provides an accurate portrayal or account of characteristics of a particular individual, situation or group. These studies are a means of discovering new meaning, describing what exists, determining the frequency with which something occurs and/or categorising information.[8] Descriptive studies often take the form of a survey questionnaire.[9] A survey questionnaire is one of the primary data-collection instruments in social, health and

epidemiological research.[10] It is a useful way to collect data from a population that is too large in order to study each individual.[11] It is widely used as it enables researchers to collect data on an array of issues surrounding the behaviour, thoughts, and feelings of people.[12]

Advantages of interviewer-administered face-to-face surveys include personal contact between the interviewer and respondent, which can facilitate response and furnish quality information. Quantitative findings from surveys may also highlight important issues that raise questions to explore with qualitative methods.[13] Disadvantages of these types of interviews are that they are normally time consuming and expensive, and interviewer variation may affect data quality.[14]

An interviewer-administered electronic survey has the same advantages as an interviewer-administered face-to-face survey, but includes the advantages of an electronic survey: it is cost-effective, easy to create, and data is automatically captured and stored on a database that is easily accessible to the researchers at any given time. More than one interviewer has access to the same survey (that is password protected) via the Internet. Several interviewers can conduct interviews at different data-collection sites using different devices (including a tablet or an iPad). Online survey products such as Zoomerang, QuestionPro, and SurveyMonkey® have emerged over the past few years as highly convenient and cost-effective research tools. SurveyMonkey® is one of the world's leading providers of web-based survey solutions. Depending on the plan that the researcher prescribes to, it has features that include unlimited questions and responses, custom survey designs and URLs, enhanced security, the ability to export data to Excel, printable PDF and 24-hour support services.[15]

Interviewer-administered and self-administered surveys have been favoured by researchers when conducting research on consumers about food and nutrition labelling. In a systematic review of nutrition labels on pre-packaged food by Campos et al. conducted in 2010, by far the majority of the research articles on food labelling included in the review (96 of 120) were cross-sectional surveys.[6] This data-collection method was also favoured by many South African researchers that conducted research on food and nutrition labelling in the past. [16-20]

Based on the many advantages of using electronic surveys conducted by an interviewer, and since surveys are the preferred method for collecting food and nutrition labelling data, an

interviewer-administered electronic survey was selected as data-collection tool for phase one of this research.

3.7.2 Participants

3.7.2.1 Sample selection

Phase one study participants consisted of adult consumers (≥18 years) who were their households' primary food purchasers (doing >50% of the food shopping for the household) doing their grocery shopping at selected grocery stores in Cape Town, Western Cape, SA. Only the primary food purchaser was included to ensure that all participants, on a regular basis, came into contact with food labels and made decisions on what food items to buy for the household.

According to data from the 2011 Census, Cape Town has a population of approximately 3 740 026. The population consists of 38.6% black Africans, 42.4% coloureds (mixed race) and 15.7% whites, while 3.3% of the citizens are from other ethnic groups. The education- level distribution of adults living in Cape Town is shown in Table 3.1.[21]

Table 3.1: Education-level distribution of adults (20+years) in Cape Town[21]

Cape Town adult education level (adults 20+)	Total		
	Number	%	%
No schooling	42 954	1.8	9.9
Some primary schooling	197 634	8.1	
Completed primary school	113 000	4.6	43.2
Some secondary education	944 799	38.6	
Grade 12	737 663	30.2	46.9
Higher	395 442	16.2	
Unspecified	13 443	0.5	
Total	2 444 925	100	100

As shown in Table 3.1, an estimated 10% of adults living in Cape Town can be considered Illiterate or having low-literacy levels (with less than seven years of formal education), with almost 90% of the population having at least completed primary school.

From the international research it has consistently been found that consumers with higher education levels have reported greater use and understanding of nutrition labels.[22-30] These

findings are consistent with research done by Jacobs et al. in Klerksdorp, SA, who found that consumers with lower levels of education less frequently read food labels.[31]

For the purpose of this study, adults who had completed primary school and those who had completed some secondary schooling were grouped together (Grade 7 – 11) (43.2% of the population), while those with a Grade 12 qualification or higher (≥Grade 12) were grouped together (46.9% of the population). This was done to ensure a more even distribution of participants. The 9.9% of the population considered illiterate or having low literacy levels were excluded, as study participants were required to read and understand information provided on food labels. During the course of the interview, participants were required to read nutrition information on food labels, available only in English, and to interpret and apply this information.

3.7.2.2 Sampling of grocery stores:

Cape Town consists of eight health districts: Eastern, Klipfontein, Khayelitsha, Mitchells Plain, Tygerberg, Northern, Southern, and Western. Four of these health districts were selected for data collection using purposive sampling. Districts with a better distribution between the three main ethnic groups (compared to other districts where some ethnic groups are poorly represented) were selected for the study, namely, Eastern, Northern, Southern, and Western (Table 3.2).[21]

Table 3.2: Health districts of Cape Town with ethnic distribution per district

Health district	Black African	Coloured	Whites	Other
Eastern	34.7%	47.2%	15.8%	2.3%
Klipfontein	44.7%	48.7%	0.7%	5.9%
Khayelitsha	98.6%	0.6%	0.1%	0.7%
Mitchells Plain	46.1%	52.5%	0.1%	1.3%
Northern	24.7%	25.6%	47.2%	2.5%
Tygerberg	19.3%	66.3%	10.8%	3.6%
Southern	19.4%	49.9%	25.3%	5.4%
Western	36.4%	30.3%	28.6%	4.7%

A list of grocery stores from the four major food retailers in SA (Shoprite/Checkers, Pick n Pay, Spar, and Woolworths Foods) within the chosen health districts was obtained from their respective websites (www.shoprite.co.za and www.checkers.co.za; www.pnp.co.za,

www.spar.co.za, www.woolworths.co.za) using the "Store Locator" function on the website. One Shoprite/Checkers, one Pick n Pay, one Spar, and one Woolworths Food store was randomly selected from the list using the Excel random number generation function. If the store was located in an area known for gang violence/crime and thus deemed unsafe for data collection, another store was randomly selected from the list. For the Shoprite and Checkers stores the following stores were included in the list: Shoprite, Usave, Checkers Hyper and Checkers. For Pick n Pay the following stores were included in the list: Pick n Pay Family Stores (Pick n Pay and Pick n Pay hypermarkets were not included as permission to conduct research at these stores was not granted by Pick n Pay head office). For Spar the following stores were included in the list: Superspar, Spar, and Kwikspar. For Woolworths, only Woolworths stores with a Woolworths food section were included). Jacobs et al.[31] followed a similar sampling strategy when conducting food-label research on consumers in the Potchefstroom area of SA.

In total, 16 grocery stores were selected, four per health district, to ensure an equal number of food retailers per district. It was assumed that these retailers stocked food products that mostly complied with current labelling legislation and therefore consumers shopping at these stores had been exposed to the correct labelling information. Figure 3.2 provides a graphic description of the sampling of the grocery stores.

Cape Town							
Stratified into eight health districts							
Eastern	Klipfontein	Khayelitsha	Mitchells Plain	Northern	Tygerberg	Southern	Western
Purposive sampling of four health districts							
Eastern		Northern		Southern		Western	
Random sampling of one grocery store per food retailer (16 retailers in total)							
Eastern		Northern		Southern		Western	
1 Shoprite/Checkers 1 Pick n Pay 1 Spar 1 WW Food		1 Shoprite/Checkers 1 Pick n Pay 1 Spar 1 WW Food		1 Shoprite/Checkers 1 Pick n Pay 1 Spar 1 WW Food		1 Shoprite/Checkers 1 Pick n Pay 1 Spar 1 WW Food	

WW = Woolworths

Figure 3.2: Sampling of grocery stores

3.7.2.3 Sampling of participants

Phase one study participants consisted of adult consumers (≥18 years), meeting the inclusion criteria, that did their grocery shopping on the day of data collection at one of the selected grocery stores. Consumers were recruited by the researchers, using convenience sampling, to take part in the study. Once a researcher had finished conducting her interview with a participant, the next participant exiting the grocery store was selected to take part.

Although convenience sampling was employed to recruit participants, grocery stores were randomly selected, while participants were recruited at different times of the day and different days of the week. This was done in an attempt to incorporate aspects of representativeness into the non-random sample.

3.7.2.4 Sample size

For a cross-sectional descriptive survey the sample size needed can be computed by estimating a proportion/percentage in the population within a certain degree of accuracy. If a power analysis for a single proportion is used, one can detect a difference of 7.4% between the true value and the estimated proportion with 90% power and with significance level of 5%, when a sample of size 471 is used.

Since participants were stratified into four groups to ensure that different education levels and nutrition information label reading habits were well represented in the study population, a power analysis for a two-way factorial design was employed to check if the overall sample size of 471 would give sufficient power. The four groups in this design consisted of Grade 7–11 nutrition information readers (NIRs), Grade 7–11 nutrition information non-readers (NINRs), Grade ≥12 NIRs, and Grade ≥12 NINRs, where participants were categorised as an NIR if they read nutrition information on labels "sometimes, frequently or always" and as an NINR if they answered "seldom or never". Thus the two factors involved were grade (Grade 7–11, Grade ≥12) and nutrition information label reading (NIRs, NINRs).

Such a power analysis was done to calculate the sample size for a two-way ANOVA (2 x 2) design. The power was set at 90% with an effect size of 0.3 for interaction and a type I error rate of 0.05, giving a minimum sample size of n=118 for each of the four groups and a total minimum sample size of N=472.

Although a minimum sample size of 472 was required to achieve this power for data analysis, a target of N=960 was set (240 participants per health district; 60 participants per selected grocery store) based on the available resources to improve on the power of the test. The smallest sample size obtained per group was n=173 (Grade ≥12 NINRs). For such a sample size per group an effect size of 0.246 for interaction can be detected with 90% power.

3.7.2.5 Inclusion criteria

All adult consumers (≥18 years of age) visiting the grocery store on the day of data collection who were their households' primary food purchasers (doing more than 50% of the shopping) were eligible for inclusion.

All literate consumers (with a Grade 7 qualification or higher) that were able to read label information and conduct an interview in English were included.

3.7.2.6 Exclusion criteria

Consumers that were unwilling to participate or unwilling to give written informed consent were excluded.

3.7.3 Methods of data collection

3.7.3.1 Standardisation of the research team

Four research assistants assisted the researcher with the interviewer-administered electronic surveys over the course of 48 research days (approximately eight weeks – six days per week). All four research assistants also assisted the researcher during the pilot of the interviewer-administered electronic survey over the course of one day.

Four contract positions for research assistants were advertised three months before the start of the pilot study for phase one using the Association for Dietetics in South Africa (ADSA) newsletter. Interviews for these positions were held with applicants two months before data collection commenced. The four research assistants appointed were female, registered dietitians between the ages of 26 and 46 and able to speak Afrikaans and English fluently. All research assistants had access to a device (tablet or iPad) for data-collection purposes and were computer literate.

Thus, the research team responsible for data collection during phase one comprised the researcher and four research assistants.

Two weeks prior to the pilot study for phase one, the researcher conducted a full-day standardisation session with the four research assistants. During this session the research assistants received training notes with the aims and objectives of the study, sampling and coding of the participants, location of data-collection sites, procedures to be followed during data collection, and training on how to obtain informed consent from participants. Each question from the survey was discussed in detail to ensure everyone understood the question.

Feedback sessions were held with the four research assistants directly after the pilot study and every second week during the data-collection period, to discuss any difficulties experienced with data collection, to address any questions or concerns, and to plan the data collection for the upcoming weeks.

3.7.3.2 Research process

The researcher/research assistants (interviewers) obtained permission (Addendum A) to collect data at the selected grocery stores from either the head office of the retailer and/or the managers/owners of individual grocery stores, depending on the procedure stipulated by the particular retailer. Table 3.3 provides a summary of the 16 grocery stores that were selected for data collection from week one to eight and from whom permission was obtained.

Table 3.3: Grocery stores selected for data collection

Data collection period	District	Retailer	Grocery store	Permission obtained from
Week one	Northern	Woolworths Food	Cobble Walk	Store manager
Week one	Northern	Woolworths Food	Sea Point	Store manager
Week two	Eastern	Pick n Pay Family Store	Soneike	Owner
Week two	Western	Pick n Pay Family Store	Blouberg	Owner
Week three	Eastern	Kwikspar	Vergelegen	Owner
Week three	Western	Superspar	Parklands	Owner
Week four	Eastern	USave	Sir Lowry's Pass Village	Head office and store manager
Week four	Western	Checkers Hyper	Parklands	Head office and store manager
Week five	Eastern	Woolworths Food	Somerset West	Store manager
Week five	Western	Woolworths Food	Flamingo Vlei	Store manager
Week six	Northern	Pick n Pay Family Store	Brackenfell	Owner
Week six	Southern	Pick n Pay Family Store	Plumstead	Owner
Week seven	Northern	Superspar	Kraaifontein	Owner
Week seven	Southern	Spar	Groote Schuur	Owner
Week eight	Northern	USave	Kraaifontein	Head office and store manager
Week eight	Southern	USave	Ottery	Head office and store manager

One week before the start of data collection at a particular store, an interviewer contacted the store manager and arranged to meet her/him on the first day. During this meeting, the interviewer introduced herself to the store manager and made arrangements with the store manager regarding which days and times data collection was to take place and where to conduct the interviews. The interviews were conducted outside the store entrance in a relatively quiet area. Owing to the nature of this type of consumer research, a private, quiet

area with no disruptions for the interviews was not possible, but a suitable area was pre-determined by the interviewer and the manager. A table and two chairs were provided by the interviewer.

The interviewers, wearing name badges to identify themselves, approached potential participants as they exited the grocery store. Each grocery store was visited over the course of six days by the same two interviewers, as agreed upon with the store manager (four week days and two weekend days over the course of one week). A total of 60 participants was selected per grocery store to take part in phase one of the study, over a period of six days (approximately ten participants were recruited per grocery store per day). Data collection took place at different times of the day, including early morning, during the course of the afternoon and early evening. This was done to include working and non-working participants as well as those that prefer to do their shopping at a specific time of day for whatever reason.

The interviewer approached potential participants as they exited the grocery store. The interviewer introduced herself and explained to the participant what the research study entailed and what was expected of them if they participated. The interviewer made it clear to the participant that to be included in the study, the participant had to meet all the inclusion criteria of the study. If the participant agreed to take part in the study, the interviewer then took the participant to the pre-determined area to conduct the interview. To determine whether a potential participant met the inclusion criteria, screening questions were asked (Addendum B). The first question that participants had to answer related to whether they were the primary food shoppers in the household. As the interviewer worked through the screening questions, participants could possibly have been excluded based on the answers provided. Questions of a more sensitive nature (related to literacy and age) were asked towards the end of the screening questionnaire. The section related to whether the participant was an NIR or NINR was completed on the screening form by the interviewer after the survey (to facilitate the planning of the FGDs in phase two). If participants did not meet the inclusion criteria, they were thanked for their willingness to take part, but informed that they unfortunately did not meet the criteria and therefore were not eligible to participate in the study. If the participant met the inclusion criteria, he/she was given a unique participant code that was used on all documentation and the process of obtaining written informed consent commenced. Participants received a copy of the consent form. Consent forms were

available in English (Addendum C), Afrikaans and isiXhosa. After consent was obtained, the interview commenced. The interviewer used a tablet or iPad while conducting the interview. The interviewer filled in the answers on the device during the course of the interview. Paper surveys were available as a backup if the interviewer experienced technical problems with the device. After the interview, the interviewer submitted the survey and then determined if the participant was interested in taking part in the FGDs in phase two and three. If participants were interested, the interviewer requested their contact details. The contact details were only used for this purpose. The interviewer then thanked the participant for his/her participation. Participants were then compensated for their time with a R50 food voucher from the store that they exited.

3.7.3.3 Interviewer-administered electronic survey

The interviewer-administered electronic survey was available in English, since English is the main language used on food labels in SA and the participant was required to read nutrition information from an actual food label example. The survey (Addendum D) was compiled by the researcher and based on the research objectives of this study. The survey consisted of six sections. Sections B, C, D and E consisted of a combination of questions adapted from existing questionnaires used in similar studies[6, 17, 23, 31, 32] and newly constructed questions. The knowledge section (section F) was based on a questionnaire developed by Van der Merwe et al.[16] The online survey tool, SurveyMonkey®, was used to compile the survey. Figure 3.3 gives a description of the sections of the survey.

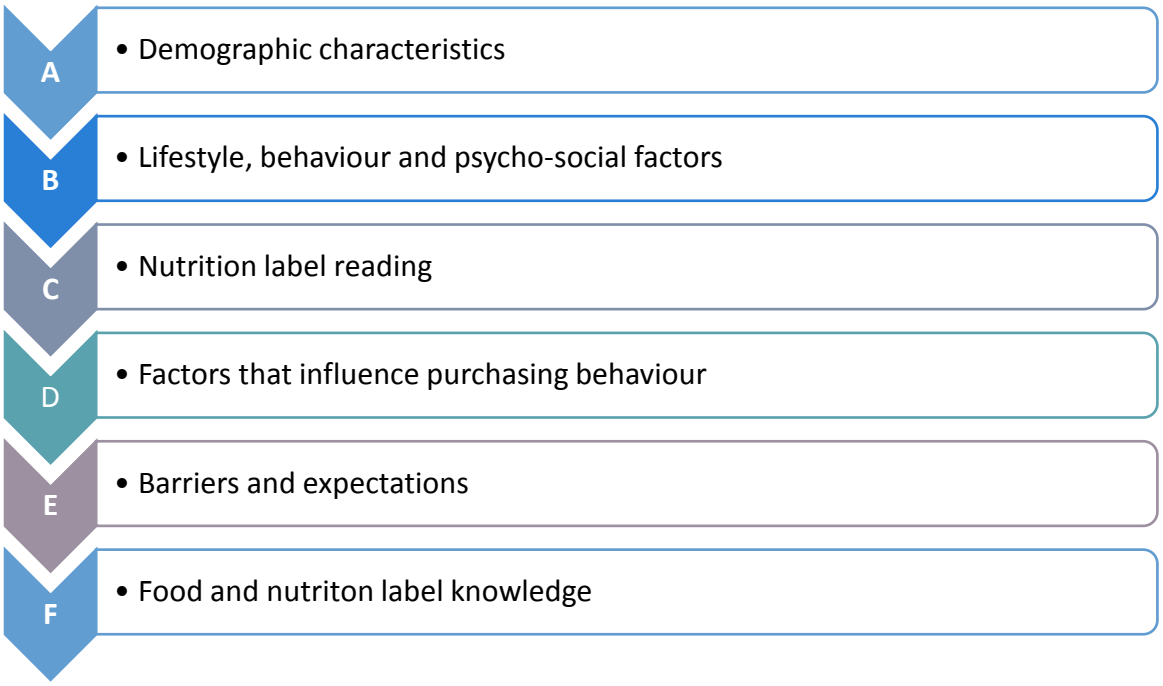


Figure 3.3: Interviewer-administered electronic survey layout

Section A included questions relating to the demographic characteristics of the participant such as age, gender, ethnicity, education level, income, occupation and marital status. Mostly closed-ended questions were used for this section of the survey.

Section B contained questions on selected aspects related to the lifestyle, behaviour and psycho-social factors of participants such supplement use, special diets and health status. Mostly closed-ended questions and Likert scales were used.

Section C of the questionnaire included questions on the reading of the nutrition information on food labels and opinions of consumers with regard to the importance of nutrition information on food labels. This section included questions on the reasons for using nutrition information and the list of ingredients on food labels, aspects of the nutrition information on food labels used most often, the importance of claims, including nutrient content and health claims, and HELs.

Section D of the questionnaire included questions on self-reported factors related mostly to the food label that influence the purchasing behaviour of consumers.

Section E of the questionnaire included questions on barriers to using the nutrition information on food labels, consumer expectations of labels, and suggestions for improvement of the nutrition information on food labels.

Section F was the knowledge section of the questionnaire and consisted of knowledge questions on food and nutrition labelling, including locating of information on the label, calculations based on the product, nutrient content claims and the ability to identify HELs.

The survey took approximately 15 – 30 minutes to complete.

3.7.3.4 Pilot study

To test the validity of the interviewer-administered electronic survey, a pilot study was conducted two weeks before the start of phase one. One grocery store located within the Tygerberg health district was selected for the pilot study, by means of convenience sampling. The Tygerberg health district was chosen because the district was not included in the main study. Twenty participants were included in the pilot study and each interviewer conducted four interviews. Permission to conduct the pilot study at the selected grocery store (Kwikspar, De Tyger) was obtained from the store owner. The exact procedure to collect data (as described in Section 3.7.3.2) was followed for the pilot study.

3.7.3.4.1 Validity

Content validity refers to the appropriateness of all items included in an instrument in representing the construct.[33] The interviewer-administered electronic survey was reviewed by a panel of six individuals – four dieticians and two food scientists (Addendum E), identified by the research team, with expert knowledge on food and nutrition labelling in SA. They made comments and recommendations on the relevance of the content, the level of understanding and the appropriateness of the questionnaire for the target group. The survey was adapted according to their recommendations.

Face validity refers to the extent to which the measure or question makes sense to those knowledgeable about the subject or to the interviewers familiar with the language and culture of participants.[34] During the pilot study for phase one, interviews were conducted with participants representative of the target group who appraised the survey after the completion of the interview, answering questions related to the survey. Questions covered aspects related to whether the participant understood all questions, the language, format and layout of the survey, procedure followed and time it took to complete the survey. (Addendum F). Based on the comments received, the order of some questions was changed

to improve the flow of each section, some questions were reworded to improve understanding, and the questionnaire was shortened by removing certain repetitive questions. Figure 3.4 gives a graphic description of the process followed to improve content and face validity of the interviewer-administered electronic survey.

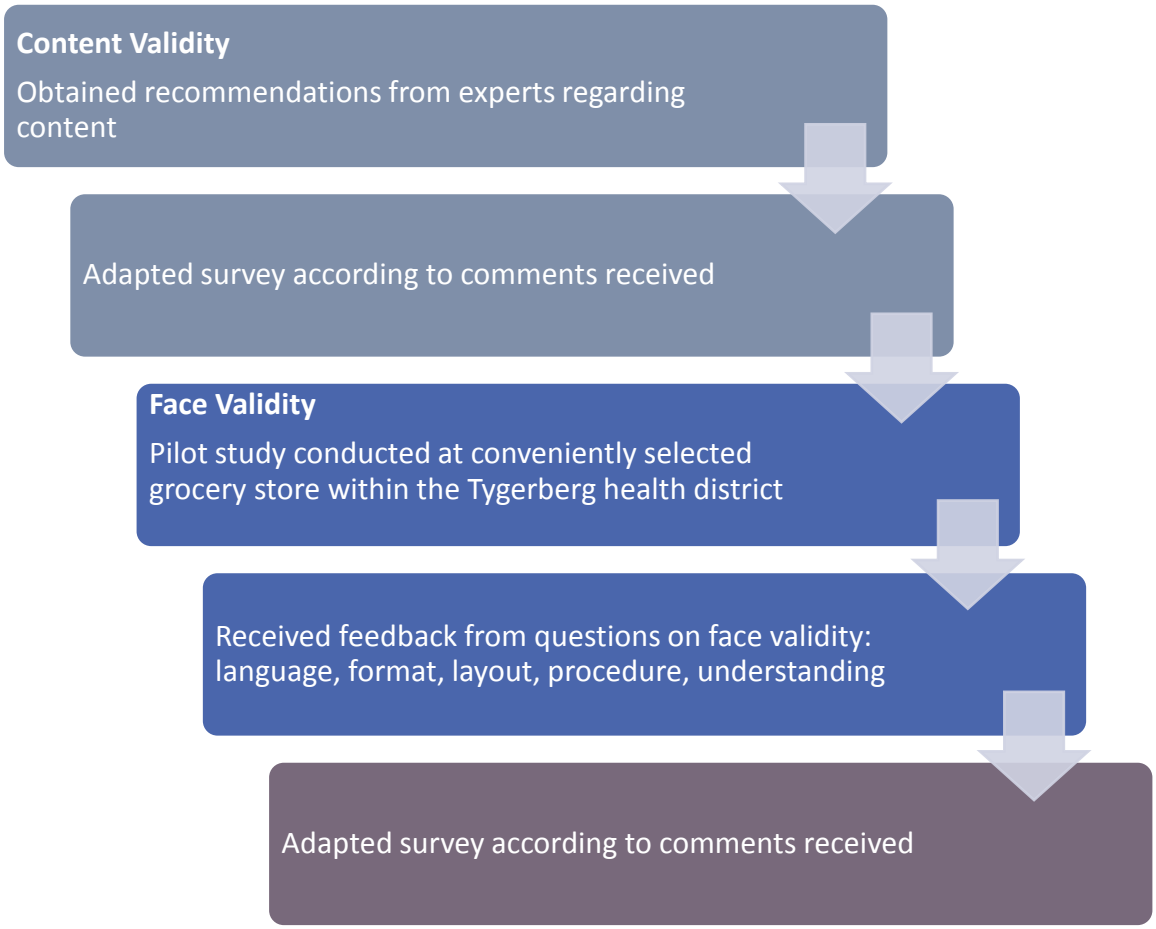


Figure 3.4: Process followed to improve the validity of the interviewer-administered electronic survey

3.7.3.4.2 Reliability

Reliability refers to the degree of similarity of the results obtained when the measurement is repeated on the same subject or the same group.[35] Reliability of the interviewer-administered electronic survey was improved through appropriate screening of research assistants to ensure that they had the correct qualifications. The research assistants received extensive training prior to the start of the research study as well as regular refreshers throughout the course of data collection. All interviewers were standardised in terms of the correct interview

procedures and techniques to follow during the course of data collection. The fixed format of an electronic survey also assisted in improving the reliability of the data.

3.7.4 Quality assurance

3.7.4.1 Training

The four research assistants were standardised and trained prior to the pilot study for phase one (as described in Section 3.7.3.1).

During the course of the data-collection period for phase one, the researcher had regular contact sessions with the research assistants for follow-up training and to discuss issues that arose during data collection. Apart from doing interviews, the researcher conducted regular site visits to each of the 16 selected grocery stores over the course of the eight-week data-collection period. The researcher was also in contact via telephone with each research assistant on a daily basis.

3.7.4.2 Data storage

Potential problems related to using an electronic survey were identified. The following was done to address these potential problems:

Problems with internet connectivity

Interviewers experienced some problems with internet access at certain sites during the data-collection period. This was overcome by having paper surveys available that were completed by the interviewer.

Safeguarding of data

Data was exported from the database into a password-protected Excel document on a daily basis throughout the data-collection period and a back-up of the Excel document was stored at a separate location in a locked cabinet. Data on the SurveyMonkey® database is password protected and not device specific. If a device is stolen, for example, the database can be accessed using another device (by providing the particular login and password details). Fortunately, no devices were lost or stolen during the data-collection period.

All signed consent forms as well as screening forms were stored in the office of the researcher in a locked cabinet and will be kept for five years.

3.7.4.3 Food vouchers

The R50 food vouchers for participants were purchased by the researcher. The research assistants were issued with the vouchers (no more than 30 vouchers were issued at a time). The research assistant signed for the vouchers. Each participant signed for the voucher after completion of the electronic survey. The research assistants submitted the signed record to the researcher after data collection and before receiving the next set of vouchers (Addendum G).

3.8 Phase two: Exploring the factors that influence the food-purchasing behaviour of consumers and consumer expectations and perceived barriers regarding the nutrition information on food labels

3.8.1 Rationale for using a qualitative approach

Phase two of the research was conducted within a qualitative paradigm using an interpretative phenomenological approach. Qualitative research allows researchers to understand how people perceive their situation and their role within this context. It is out of these perceptions and social influences that behaviour is born. Qualitative research can help determine why these behaviours occur or why people hold specific views.[36] In the second edition of their *Handbook of Qualitative Research*, Denzin and Lincoln offer the following definition of qualitative research:

> *Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that makes the world visible. These practices ... turn the world into a series of representations including field notes, interviews, conversations, photographs, recordings and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them*.[37]

Underlying the qualitative approach are different research paradigms (best described as systems of thinking), including positivism and interpretivism. The purpose of research in interpretivism is understanding and interpreting everyday events, experiences and social structures and the values people attach to these phenomena.[38, 39] It is concerned with understanding the world as it is from the subjective experiences of individuals.[36]

An exploratory research approach from an interpretative phenomenological point of view was considered suitable for this phase of the research, as it permits the exploration, description and understanding of actual real-life experiences of consumers.[40]

The group interview or FGD is a qualitative research method used since the mid-twentieth century. It has been used extensively for exploring issues related to brand imaging, packaging and product choice in the past.[41] It is an interview with smaller groups of people on specific targeted and focused issues and typically consists of five to ten people with similar backgrounds and/or experiences who participate in the group interview for one or two hours. In any given study, a series of different FGDs should be conducted to obtain a variety of perspectives and to increase confidence in the patterns that emerge. The sample for FGDs is selected purposefully and should represent the target population, while keeping in mind factors such as age, gender, race and socio-economic background.[42] FGDs were developed in recognition that many consumer decisions are made in a social context, often growing out of discussions with other people. FGDs were therefore developed as a way of stimulating the consumer group process of decision making to gather more accurate information about the preferences of consumers. The objective of an FGD is to obtain high-quality data in a social context where people can consider their own views within the context of the views of others. An FGD should be carefully planned and conducted by a skilled facilitator.[43]

For phase two of the research, FGDs were utilised to interpret and further explore key issues relating to the use, understanding and practices of consumers regarding food and nutrition labelling within different social contexts. Issues that emerged from the quantitative survey were explored further in FGDs to gain a better understanding of the current situation, to make informed recommendations on labelling barriers, and to identify opportunities for improvement, education and change in future.

3.8.2 Participants

3.8.2.1 Sample selection

Phase two study participants consisted of adult consumers (≥18 years) who were their households' primary food purchasers in Cape Town, Western Cape, SA, who indicated during phase one that they were willing to take part in an FGD. Participants were selected by means of purposive sampling according to their education level and whether they were NIRs or NINRs.

3.8.2.2 Sample size

A total of eight FGDs were conducted during phase two (apart from the pilot FGD). Five to ten participants were included per focus group. Two FGDs per group (Grade 7 – 11 NIRs; Grade 7 – 11 NINRs; Grade ≥12 NIRs; Grade ≥12 NINRs) were conducted. FGDs were evenly distributed between the four health districts.

During the initial planning of the FGDs, it was proposed that two FGDs per group would provide sufficient data to explore and describe the key issues relating to the use, understanding and practices of consumers with regard to food and nutrition labelling. However, throughout the data collection period, the researcher remained cognisant of the concept of data saturation. Data saturation entails:

> *Bringing new participants continually into a study until the data set is complete, as indicated by data replication or redundancy. In other words, saturation is reached when the researcher gathers data to the point of diminishing returns, when nothing new is being added.*[44]

After conducting nine FGDs and analysing the data collected, the researcher was satisfied that data saturation had been reached, as no new information emerged during the last two FGDs.

3.8.2.3 Inclusion criteria

Adult consumers (≥18 years of age) who indicated during phase one of the research study that they were willing to participate in an FGD on food and nutrition labelling were eligible for inclusion.

All literate consumers (with a Grade 7 qualification or higher) able to read label information in English were included.

3.8.2.4 Exclusion criteria

Consumers unwilling to give written informed consent to take part in the FGD were excluded.

Consumers unwilling to give written informed consent to be recorded for the purpose of the FGD were excluded.

Consumers who were not comfortable speaking either Afrikaans, English or isiXhosa during the FGD were excluded.

3.8.3 Methods of data collection

3.8.3.1 Standardisation of the research team

Two research assistants who collected data in phase one were trained and standardised by the researcher one month before the start of the pilot study for phase two, as a focus-group facilitator and observer respectively. To familiarise herself with qualitative research methodology and in preparation for the research, the researcher completed a six-month postgraduate short course.[i]

Thus, the research team responsible for data collection during phase two comprised the researcher (focus-group facilitator) and two research assistants (focus-group facilitator and focus-group observer). Facilitators and focus-group observers were female, registered dietitians (36, 41 and 46 years old respectively), and proficient in both English and Afrikaans.

The researcher facilitated five FGDs (including the pilot) as focus-group facilitator, while one of the research assistants conducted the remaining four FGDs as focus-group facilitator. The second research assistant took the role of focus-group observer for all nine FGDs (including the pilot).

Two weeks prior to the pilot study for phase two, the researcher conducted a full-day standardisation session with the two research assistants. During the standardisation session, the facilitator and observer (research assistants) received training notes on how to obtain informed consent from participants and how to facilitate the completion of the self-administered demographic questionnaire by each participant, before the start of the FGDs.

[i] Masters in Clinical Epidemiology – Qualitative Research Methodology module, Faculty of Medicine and Health Sciences, Stellenbosch University (2nd semester 2014)

The facilitator received training on how one should conduct an FGD as well as information on the discussion points for the focus group. The focus-group observer received training on her role during the FGD, that is, keeping notes on body language and social processes within the group.

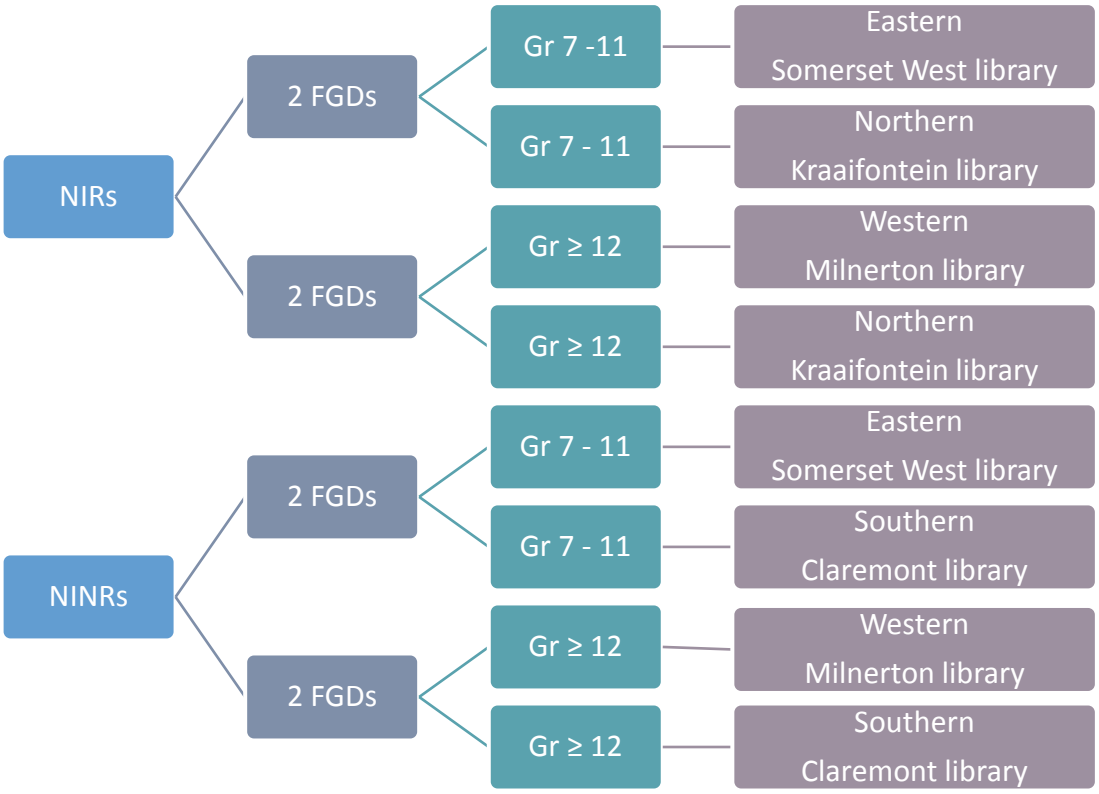
A feedback session was held with the two research assistants directly after the pilot study to discuss the practical arrangements of the FGD, the process followed during the FGD, the flow of the discussion as well as the discussion guide. Debriefing sessions were held with both research assistants every two weeks during the data-collection period to discuss any difficulties experienced during the FGDs, to address any questions or concerns, and to plan the data collection for the upcoming weeks.

3.8.3.2 Research process

Figure 3.5 gives a graphic presentation of the FGDs, with locations, that were conducted during phase two of the study. To further explore the use, interpretation and understanding of nutrition information on food labels, FGDs were conducted with NIRs. Other topics that were explored included food shopping habits of consumers, factors that influence food-purchasing behaviour and consumers' perceptions on and attitudes towards certain international and national HELs. Four FGDs were held: two FGDs for consumers with a Grade 7 – 11 education level and two FGDs for consumers with a Grade ≥ 12 education level.

FGDs were conducted with NINRs to further explore reasons for not reading and using nutrition information on food labels. Food shopping habits of consumers, factors that may influence purchasing behaviour and consumers' perceptions on and attitudes towards certain available international and national HELs were also discussed. Four FGDs were held: two FGDs for consumers with a Grade 7 – 11 education level and two FGDs for consumers with a Grade ≥ 12 education level.

In total, eight FGDs were conducted during phase two of the study (apart from the pilot FGD).



NIRs: Nutrition information readers; NINRs: Nutrition information non-readers; FGDs: Focus-group discussions; Gr: Grade

Figure 3.5: Phase two focus-group discussions

After the completion of the survey in phase one, participants were asked whether they would like to participate in discussions to further explore their food-shopping and label-reading habits. If they were interested, they provided their names and contact details to the researchers on a separate screening form that also included their education level, language preference and whether they read the nutrition information on food labels (as determined by asking participants the following question in the survey: *How often do you read the nutrition information on a food label? (This includes any information regarding the nutritional content of the food, e.g., nutrition information table, list of ingredients, any nutrition or health claims, any health-endorsement logos).* Participants who indicated "sometimes, frequently or always" were classified as an NIR. Participants who indicated "seldom or never" were classified as an NINR.

Participants were purposefully selected for the respective FGDs according to their education level, whether they read the nutrition information on food labels, their language preference, and the health district where they were recruited for the survey. FGDs were conducted in Afrikaans and English (the option to conduct the FGDs in isiXhosa was available; however by

far the majority of participants (>90%) indicated English or Afrikaans as their language of preference) by the two focus-group facilitators and one focus-group observer who made notes regarding participant interaction and nonverbal cues.

Lists were compiled after phase one data collection with contact details of potential phase two participants according to whether they were classified as NIRs or NINRs, their education level, language preference, and area where they were initially recruited. The facilitators contacted the participants one week before the planned FGD. Several participants were contacted until ten participants agreed to take part in an FGD. Bloor et al. suggest that owing to recruitment problems that are arguably the greatest source of failure in focus-group research, it is prudent to over-compensate when organising FGDs.[45] Therefore, an FGD was arranged with 10 participants, although it was still considered acceptable to conduct the discussion with only five participants.

It is recommended in the literature that the venue for an FGD should be private, comfortable, safe, free from disturbances, and convenient for the members of the group.[36] A centrally located public library in each of the four health districts was chosen for this purpose. Libraries were contacted approximately two weeks before the FGDs to book the venue. All four libraries had private meeting rooms available to conduct the FGDs. The focus-group facilitator or observer arranged a visit to the venue prior to each FGD to familiarise herself with the venue, the equipment available and where to serve the refreshments.

The day before each FGD, the facilitator sent an SMS or email (depending on the contact details provided by the participant) to all participants to remind them of the FGD. On the day, the facilitator and focus-group observer arrived early to prepare the venue for the FGD and checked the recording equipment. Refreshments were served upon arrival for participants to relax and familiarise themselves with the environment. Prior to starting the FGD, the facilitator opened the discussion by welcoming the group, introducing herself and giving everyone a chance to introduce him/herself. The facilitator provided an overview of the topic, outlining the ground rules of the discussion and explaining the role of the observer and the recorder. The facilitator discussed the issue of confidentiality with the participants and asked everyone to keep information discussed in the group confidential. Participants were then given a unique participant code that was used on all documentation. Written, informed

consent was obtained from all participants as well as consent to record the discussion. Consent forms were available in English (Addendum H), Afrikaans and isiXhosa. A copy of the consent form was given to each participant. Participants were assured that taking part was voluntary and that they could terminate their participation in the discussion at any time. After consent had been obtained, the facilitator started the FGD.

Participants completed a short one-page demographic questionnaire (Addendum I) for the researcher to provide background information on participants when reporting the data. The discussion then commenced. No language barriers were experienced during any of the FGDs.

The facilitator used discussion guides developed for NIRs (Addendum J) and NINRs (Addendum K) respectively, containing open-ended questions and discussion probes to help keep the discussion focused and to gather data appropriate to the aims and objectives of the study.

At the end of the discussion, participants were thanked for their participation and received a R150 food voucher to compensate them for their time and travel expenses. All FGDs took between 60 and 90 minutes.

3.8.3.3 FGD guides

Two discussion guides for phase two were developed (for NIRs and NINRs respectively) by the researcher prior to the start of phase one, based on the aims and objectives of the study. After phase one data collection, changes were made to the discussion guides based on the findings from the phase one survey. Changes mostly related to simplifying words and using less complex terminology – specifically terminology that some participants struggled with in phase one (that required clarification). Themes and questions remained unchanged.

Table 3.4 summarises the themes covered in the discussion guides.

Table 3.4: Themes covered in nutrition information readers and nutrition information non-readers discussion guides

<table>
<tr><th>Discussion guide:
Nutrition information readers</th><th>Discussion guide:
Nutrition information non-readers</th></tr>
<tr><td colspan="2">Theme 1: Self-reported factors that will influence food-purchasing behaviour</td></tr>
<tr><td>Theme 2: Effective nutrition labelling techniques and consumer expectations</td><td rowspan="2">Theme 2: Self-reported reasons for label non-use and barriers to using nutrition information on food labels</td></tr>
<tr><td>Theme 3: Self-reported interpretation/understanding of food labels</td></tr>
<tr><td colspan="2">Theme 3/4: The use of health-endorsement logos in nutrition labelling</td></tr>
</table>

3.8.3.4 Pilot study

A pilot FGD was conducted two weeks prior to the first FGD. A pilot was conducted so that the research team could familiarise themselves with the general procedure to be followed on the day, the flow of the discussion, and to discuss and reflect on any problems or issues that arose during the FGD in order to improve on the procedure and discussion. Ten participants were recruited (Grade 7–11 NINRs) from the list of potential phase two participants compiled by the researcher after completing phase one. This group was chosen owing to the large number of participants from this health district (Northern) willing to take part in phase two. Both facilitators and the focus-group observer attended the FGD, although the researcher facilitated the discussion while the second facilitator (research assistant) only observed the process and the discussion. The same procedure as described in Section 3.8.3.2 was followed for the pilot FGD.

No changes were made to the discussion guides following the pilot study, although the order of some questions was changed to improve flow. Data collected from the pilot FGD was therefore included as part of the data collected for phase two as the information obtained was relevant and added value to the focus-group data.

3.8.3.5 Reducing bias in qualitative research

When conducting qualitative research, the researcher is the primary research instrument and therefore emphasis should be placed on the potential prejudicial influence of the researcher during the process of data collection and analysis. Potential biases, including personal background, previous work, personal experiences or the reasons for doing the research can

impact on how data is collected, analysed and interpreted. Care should therefore be taken to ensure that the neutrality of the researcher is emphasised and that he or she assumes the role of an independent academic researcher. The views of the researcher should not be allowed to intrude upon the discussion.[46]

In order to reduce bias, the facilitators prepared in advance for each data-collection encounter while being mindful of their roles as dietitians and researchers. For the purpose of the FGDs, participants were not informed that the facilitators and observer were registered dietitians, as it was felt that this might influence participant responses as they might think that they should provide answers a dietitian would want to hear.

Both the researcher and research assistants experienced some initial fears about the research process and specifically the FGDs. After a research team debriefing session, it was realised that the fears were based on the assumptions that people would be hesitant to offer their time and provide honest answers to questions posed. Although there were times when it was difficult to engage some participants, the researchers were surprised by the honesty and openness of participants. Participants seemed to enjoy the FGDs and participated enthusiastically. The nervousness and initial fears of the researchers soon disappeared after the start of the first FGD.

3.8.4 Quality assurance

3.8.4.1 Training

The researcher standardised and trained the two research assistants (focus-group facilitator and observer) prior to the pilot study for phase two (as described in Section 3.8.3.1).

A feedback session was held with the two research assistants directly after the pilot study, while debriefing sessions were held with both research assistants every two weeks during the data-collection period to discuss any difficulties experienced during the FGDs, to address any questions or concerns, and to plan the data collection for the upcoming weeks.

3.8.4.2 Data storage

Back-up files of the audio recordings of the FGDs were made after each FGD. All personal identifiers were removed from the recordings before transcription. The audio recordings of

the FGDs were sent to transcription services which transcribed the recordings. A separate electronic file with unique name was created for each FGD. Back-up files of the transcriptions were made and stored in a separate location from the original transcriptions. All electronic files, including audio files and transcriptions, were stored on a password- protected laptop. All audio files will be erased after the completion of the research.

Completed socio-demographic questionnaires, signed consent forms from phase two, as well as field notes made during the FGDs, were stored in the office of the researcher in a locked cabinet and will be kept for five years.

3.8.4.3 Food vouchers

The R150 food vouchers for participants in the FGDs were purchased by the researcher. For the four FGDs facilitated by the research assistant, 10 vouchers were issued per FGD. The research assistant signed for the vouchers upon receipt. Each participant signed for the voucher after completion of the FGD. The research assistant submitted the signed record to the researcher after each of the four FGDs and before receiving the next set of vouchers (Addendum L). For the FGDs conducted by the researcher (five FGDs including the pilot), all participants signed for their vouchers.

All signed records of vouchers were stored in the office of the researcher in a locked cabinet.

3.9 Phase three: Development and pilot testing of HELs

3.9.1 Rationale for the approach

For phase three of the research a mixed-methods approach was followed. HELs were developed by a graphic design company based on the data collected during phase two. A modified Delphi technique, conducted with experts in the fields of nutrition and food science, was employed to eliminate the lowest scoring HELs and to improve the design of the remaining logos. FGDs were conducted to pilot test the improved HELs and to further eliminate the lowest scoring logos.

As FGDs are the ideal setting to stimulate the consumer group process of decision making and to gain information about the preferences of consumers,[43] it was argued that it was logical to

use the information obtained from the FGDs in phase two to make recommendations for the development of HELs (by an independent graphic design company) for healthy food products based on the South African nutrient profile model.

The HELs were developed by a graphic design company with expertise in logo design. The actual development of the logo did not fall within the scope of this study.

Adler and Ziglio defines the Delphi technique as an exercise in group communication that brings together and synthesises the knowledge of a group of geographically scattered participants who never meet.[47] It is a flexible approach that is used commonly within the health and social sciences.[48] One of the main reasons for the popularity enjoyed by this technique is that a large number of individuals across diverse locations and different areas of expertise can be included anonymously.[49] For the purpose of this phase, a modified version of this technique was employed.

FGDs were once again used to determine the acceptability of and make recommendations to improve these newly designed HELs in a group setting during the pilot testing of the logos.

3.9.2 Participants

3.9.2.1 Sample selection

3.9.2.1.1 Experts

When employing the Delphi/modified Delphi technique, the selection of the sample of experts usually involves non-probability sampling techniques, either purposive sampling or criterion sampling. Participants are therefore not selected randomly, so representativeness is not assured. Rather, they are selected for a purpose, to apply their knowledge to a certain problem on the basis of criteria developed from the nature of the problem under investigation.[48] Keeping this in mind, the research team purposively selected experts in the field of nutrition, food science, and food labelling from both the private and public sector (including academia, government, and industry) for inclusion.

3.9.2.1.2 Focus-group participants

Phase three study participants consisted of adult consumers (≥18 years) who were their households' primary food purchasers in Cape Town, Western Cape, SA, who indicated during phase one that they were willing to take part in an FGD. Participants were selected by means of purposive sampling according to their education level and the health district that they were recruited from in phase one. Some participants who participated in the phase two FGDs also took part in the phase three FGDs.

3.9.2.2 Sample size

3.9.2.2.1 Experts

To provide representative information, some studies employing the Delphi/modified Delphi technique have employed over 60 participants,[50] while others have involved only 15 participants.[51]

For the purpose of this research, a total of 23 experts were invited to take part in the scoring and commenting on the design of the HELs with the aim of including a minimum of 15 experts. This was done to allow for experts who declined participation for whatever reason.

3.9.2.2.2 Focus-group participants

A total of four FGDs were conducted during the pilot testing of the designed logos in phase three. Five to twelve participants were included per focus group – two FGDs with participants with a Grade 7 – 11 education level (NIRs and NINRs) and two FGDs with participants with a Grade ≥ 12 level of education (NIRs and NINRs). One FGD was conducted in each of the four health districts. Participants were purposively selected for a FGD based on their education level, language of preference and health district where they were recruited for the survey.

3.9.2.3 Inclusion criteria

3.9.2.3.1 Experts

Experts in the field of nutrition, food science and food labelling, who were willing to take part in both rounds of scoring of and commenting on HELs were included.

3.9.2.3.2 Focus-group participants

Adult consumers (≥18 years of age) who indicated during phase one of the research study that they were willing to participate in an FGD on food and nutrition labelling were eligible for inclusion.

All literate consumers (with a Grade 7 qualification or higher) that were able to read label information in English were included.

3.9.2.4 Exclusion criteria

3.9.2.4.1 Experts

Experts unwilling to sign a confidentiality agreement regarding the HEL designs were excluded.

3.9.2.4.2 Focus-group participants

Consumers unwilling to give written informed consent to take part in the FGD were excluded.

Consumers unwilling to give written informed consent to be recorded for the purpose of the FGD were excluded.

Consumers who were not comfortable speaking either Afrikaans, English or isiXhosa during the FGD were excluded.

3.9.3 Methods of data collection

3.9.3.1 Standardisation of the research team

3.9.3.1.1 FGDs

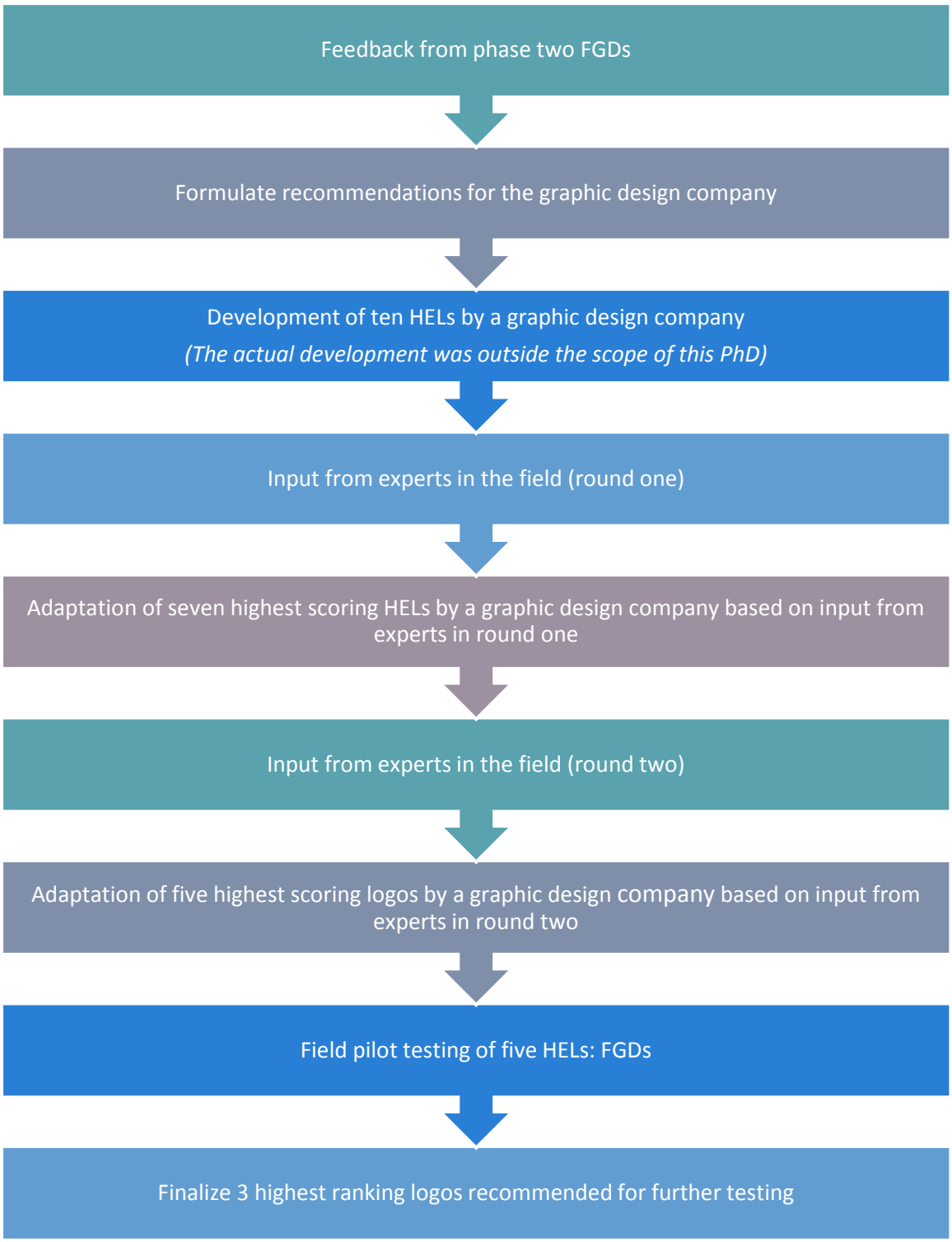
The research team responsible for conducting the FGDs in phase three comprised the researcher (focus-group facilitator) and one research assistant (focus-group observer). The same focus-group observer trained and standardised as a focus-group observer in phase two was used as observer in phase three.

The researcher facilitated all four FGDs as focus-group facilitator.

Two weeks prior to the start of the FGDs for phase three, the researcher conducted a half-day refresher training session with the research assistant. During the session, the researcher discussed the role of the observer (keeping notes, body language, and social process in the group) with the research assistant. Debriefing sessions were held with the observer after every FGD to discuss the focus-group dynamics, to address any questions or concerns, and to plan the data collection for the upcoming weeks.

3.9.3.2 Research process

Figure 3.6 gives a graphic presentation of the process that was followed for the development and pilot testing of logos in phase three.



FGDs: Focus-group discussions

Figure 3.6: Research process for the development and pilot testing of health-endorsement logos

3.9.3.2.1 Experts

Based on the feedback received from evaluating internationally and nationally available HELs in the FGDs in phase two, recommendations were formulated by performing content analysis

(using deductive reasoning) (refer to section 3.11.2) of the focus-group data (Addendum M) for an independent graphic design company situated in Bellville, Western Cape, SA.

A team of nine graphic designers then designed the ten HELs after one meeting with the researcher where the researcher provided background to the study.

During the initial design period, the researcher contacted 23 experts identified to take part in the rounds of scoring and evaluating of the HELs via email to enquire whether they would be willing to participate in the research. Nineteen experts (Addendum N) agreed to take part and signed a confidentiality agreement (Addendum O). Four declined owing to other commitments. After signing the confidentiality agreement, the experts were provided with the protocol synopsis for background information and information on the process to be followed during the rounds of scoring. They were also informed that all communication would be conducted via email. During all communication, experts were blind-copied (bc'd) to ensure anonymity.

In round one, the ten HEL designs (Addendum P) were sent to the experts to score and make recommendations to improve the design. The experts were also provided with the same summary (feedback from phase two FGDs) compiled for the graphic design company. The experts were asked to complete a scoring sheet (Addendum Q) with space for comments on the design of each HEL. HELs were scored according to the following aspects (weighted according to importance as determine by the research team): overall design (30%), consumer understanding (30%), colours (20%) and symbols/wording (20%). The experts were given two weeks to complete the first round.

After round one, the three lowest scoring HELs were eliminated and the comments summarised (Addendum R) for the graphic design company to improve the design of the remaining seven HELs.

In round two, the remaining seven HELs with improved designs (Addendum S), were once again sent to the experts to score and make recommendations to further improve the designs. The experts were provided with the summary of feedback and scores from round one. They were asked to complete a similar scoring sheet as used in round one (Addendum T) with space for comments on the design of each logo. Logos were once again scored according to the following aspects (weighted according to importance): overall design (30%), consumer

understanding (30%), colours (20%) and symbols/wording (20%). The experts were given two weeks to complete the second round.

After completing the second round of scoring and evaluating, the experts were thanked for their participation and informed that the researcher would share the data with them once published.

After round two, the two lowest scoring HELs were eliminated and the comments summarised (Addendum U) for the graphic design company to improve the design of the five remaining logos (Addendum V).

3.9.3.2.2 FGDs

Sixty participants that took part in phase one of the study were purposefully selected and invited to take part in the FGDs in phase three. Participants were once again selected based on their education level, language preference and according to the health district where they were recruited in phase one. FGDs were arranged with 15 participants to allow for participants cancelling at the last minute. It was however still considered acceptable to conduct a discussion with only five to ten participants.

FGDs were conducted in Afrikaans and English (the option to conduct the FGD in isiXhosa was available; however by far the majority of participants (>90%) indicated English or Afrikaans as their language of preference) by the focus-group facilitator and focus-group observer who made notes regarding participant interaction and nonverbal cues.

The exact same procedure as described in phase two was followed in phase three in terms of contacting participants, preparing the venue for the FGDs, as well as the process that was followed during the FGDs (welcome, written informed consent available in English [Addendum W], Afrikaans and isiXhosa, consent to record FGDs, and thanking of participants). Participants also completed a short one-page demographic questionnaire (the same questionnaire used in phase two – Addendum I) to provide background information on participants when reporting the data. No language barriers were experienced during any of the four FGDs.

The facilitator used a discussion guide (Addendum X) that was developed by the researcher and based on the research objectives of this study. Participants received a R150 food voucher

to compensate them for their time and travel expenses. All FGDs took between 45 and 60 minutes.

3.9.3.3 FGD guide

One discussion guide for phase three was developed by the researcher prior to the start of phase one, based on the aims and objectives of the study.

The discussion guide consisted of two themes: scoring of HELs and a discussion of each of the five logos. Firstly, participants were given some background on the purpose of the logo and were then requested to rank each logo (5 = “like the best” to 1 = “like the least”) according to their personal preference using a ranking sheet (Addendum Y). This was done individually and participants were requested not to talk during this exercise. After completing the ranking of the HELs, the discussion of each logo commenced. The following questions were posed with regard to each logo:

- Please give your general impression of the logo.
- Do you like the design of the logo? Why do you like / dislike the design?
- How do you feel about the colours and fonts that were used?
- In general, is the logo attractive to you? Please explain.
- Is the picture/symbol used in the logo acceptable? Please elaborate.
- If you were to look at the logo for the first time on a product, what would you understand about this specific logo?

3.9.4 Quality assurance

3.9.4.1 Training

The researcher trained the focus-group observer prior to the start of FGDs for phase three (as described in Section 3.9.3.1).

Debriefing sessions were held with the observer after every FGD to discuss the focus-group dynamics, to address any questions or concerns, and to plan the data collection for the upcoming weeks.

3.9.4.2 Data storage

Completed confidentiality agreements and scoring sheets (from the experts) were stored on a password-protected laptop and back-ups on an external device, stored in the office of the researcher in a locked cabinet.

Back-up files of the audio recordings of the FGDs were made after each FGD. All personal identifiers were removed from the recordings before transcription. The audio recordings of the FGDs were sent to transcription services which transcribed the recordings. A separate electronic file with unique name was created for each FGD. Back-up files of the transcriptions were made and stored in a separate location from the original transcriptions. All electronic files, including audio files and transcriptions, were stored on a password- protected laptop. All audio files will be erased after the completion of the research.

Completed socio-demographic questionnaires, signed consent forms, and scoring sheets from phase three, as well as field notes made during the FGDs, were stored in the office of the researcher in a locked cabinet and will be kept for five years.

3.9.4.3 Food vouchers

The R150 food vouchers for participants in the FGDs were purchased by the researcher. All participants signed for their vouchers. All signed records of vouchers were stored in the office of the researcher in a locked cabinet.

3.10 Ethics and legal aspects

The principles of research ethics – respect for others, autonomy, non-maleficence and justice – were consciously applied throughout the research process by the research team during each engagement with individual participants.

3.10.1 Health Research Ethics Committee (HREC)

To ensure accountability in research ethics, the administrative ethics processes as stipulated by the Health Research Ethics Committee (HREC), Faculty of Medicine and Health Sciences, Stellenbosch University, were followed. The study was submitted for approval to the HREC in August 2015 at the Faculty of Medicine and Health Sciences, Stellenbosch University. Ethics

approval for this research project was granted by the HREC (Reference no: S15/08/164) in December 2015 (Addendum Z). Insurance for the study was provided by Stellenbosch University.

3.10.2 Authorisation

The researcher/research assistants (interviewer) obtained permission (either orally or electronically) to collect data at the selected grocery stores from either the head office of the retailer (Shoprite/Checkers) and/or the managers/owners (Spar, Pick n Pay and Woolworths) of individual grocery stores, depending on the procedure stipulated by the particular retailer.

3.10.3 Language

The predominant languages that Cape Town residents speak are Afrikaans, English, and isiXhosa. Most residents speak and understand at least one or a combination of these languages. The interviewer-administered electronic survey used in phase one was available in English only, since English is the main language used on food labels in SA and the participants were required to read nutrition information from an actual food label example.

Participants were given the option to take part in an FGD conducted in either Afrikaans, English or isiXhosa. Only two participants indicated that they would prefer an isiXhosa FGD, although they could speak English fluently. Owing to this small percentage of participants preferring isiXhosa (one cannot conduct an FGD with only two participants), all FGDs were conducted in either English or Afrikaans.

The research team are bilingual in Afrikaans and English and conducted all the interviews and FGDs in one of these two languages as preferred by the group.

3.10.4 Written informed consent

Participation in this study was voluntary.

3.10.4.1 Phase one

Written informed consent to take part in the interviewer-administered electronic survey was obtained from all participants. Participants were also given the opportunity to ask questions

and were told that they could withdraw at any time during the survey. Each participant received a copy of the consent form. No data were collected without informed consent.

3.10.4.2 Phase two and three

Written informed consent to take part in the FGDs was obtained from all participants before commencing with the focus groups. The participants were given the opportunity to ask questions and were told that they could withdraw at any time during the discussion. Each participant received a copy of the consent form. Written consent to record the FGDs was also obtained from all participants.

3.10.5 Participant confidentiality and anonymity

3.10.5.1 Phase one

Survey information was treated confidentially and filled out anonymously. A unique identifier code was allocated to each participant. During phase one of the study, participants were asked whether they were willing to take part in FGDs during phase two and three. Contact details of these participants were only used to arrange FGDs for phase two and three. All contact details of participants were treated as confidential.

3.10.5.2 Phase two and three FGDs

The issue of confidentiality was discussed with all focus-group participants at the start of an FGD. Participants were asked to keep information discussed during the focus group confidential. All personal identifiers were removed from the audio recordings before the transcription of the discussions. Participant details were kept separate from the audio recordings at all times.

3.10.5.3 Phase three experts

During the two rounds of scoring of the HELs, the experts were not made aware of the identity of one another. When using electronic communication, all experts were blind-copied (bc'd) to ensure anonymity for the scoring period.

3.10.6 Compensation for time and travel

3.10.6.1 Phase one

Participants that took part in phase one of the study were compensated for their time with a R50 food voucher from the grocery store where data collection took place.

3.10.6.2 Phase two and three

Participants that took part in the FGDs of phase two and three were compensated for their time and travel expenses with a R150 food voucher.

3.10.7 Financial disclosure

Funding for this study was received from various sources, the main sources being:

- The Stellenbosch University HOPE Project
- Early Research Career Development Funding, Stellenbosch University
- Harry Crossley Foundation, Stellenbosch University

3.11 Data handling and analysis

3.11.1 Quantitative data

SurveyMonkey® data was exported from the database into a password-protected Excel document on a daily basis during the data-collection period (phase one). Data from hard-copy surveys was captured on the same Excel sheet by the researcher. The data was cleaned by the researcher and open-ended questions removed from the data sheet (analysis of open-ended questions is discussed in Section 3.11.2).

Data from the socio-demographic questionnaires used in phase two and three and scoring sheets from phase three was captured in Excel by the researcher.

Data was analysed using STATISTICA™ version 13 (Dell Inc. 2016) with the assistance of a statistician at the Centre for Statistical Consultation, Stellenbosch University.

Summary statistics were used to describe the variables. Distributions of variables were presented with histograms and/or frequency tables. Medians or means were used as the

measures of central location for ordinal and continuous responses and standard deviations and quartiles as indicators of spread.

Regression analysis of a continuous response variable versus ordinal input was done and then the strength of the relationship was measured with Spearman correlation.

The relationships between continuous response variables and nominal input variables were analysed using appropriate analysis of variance (ANOVA). When ordinal response variables were compared versus a nominal input variable, non-parametric ANOVA methods like Kruskal-Wallis or Mann-Whitney (for two groups) were used.

The relation between nominal variables was investigated with contingency tables and likelihood ratio chi-squared tests.

A *p*-value of $p<0.05$ represented statistical significance.

The total percentage knowledge scores calculated in phase one were interpreted based on the performance-rating scale developed by Whati et al:[52]

Table 3.5: Performance-rating scale for nutrition knowledge developed by Whati et al.[52]

Performance score (%)	Interpretation
<34	Very poor
34-51	Fair / below average
52-57	Good / average
58-75	Very good / above average
76+	Excellent

3.11.2 Qualitative data

Open-ended questions were summarised and similar responses grouped together.

The audio recordings of the FGDs were transcribed verbatim by an independent company specialising in transcription services. After the FGDs were transcribed, the researcher (first author of this manuscript) performed quality control on the data to ensure that information was captured accurately. The transcriptions were then entered into a text-analysing computer program (Atlas TI version 7). The researcher went through the transcripts systematically while applying a process of open coding to the text. For phase two focus group data, the researcher made notes of the main themes that could be established around the

key concepts explored in the FGDs and added additional themes that emerged while repeatedly reading the transcriptions. The analysis can therefore be described as deductive (pre-prepared structure), but also allowed for inductive analysis (build and develop with an open mind). For phase three, the researcher made notes of the main themes that could be established around the key concepts explored in the FGDs. The analysis can therefore be described as deductive (pre-prepared structure).

To ensure that all emerging themes were identified and to check for inconsistencies, the text was reread several times. The researcher took extra care to remain true to the data and reflect the participants' words or phrasing. The extracted themes from phase two and three are provided in the addenda (phase two: Addendum AA and phase three: Addendum AB).

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Chapter 4

Research Article: Consumer knowledge and reading of nutrition information on food labels in South Africa: A cross-sectional descriptive study

CONSUMER KNOWLEDGE AND READING OF FOOD AND NUTRITION LABELLING IN SOUTH AFRICA: A CROSS-SECTIONAL DESCRIPTIVE STUDY

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We confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

Authorship:

The principal researcher, NK, developed the idea and the protocol for this research study, planned the research, undertook data collection (with the assistance of trained research assistants), captured the data for analyses, analysed the data with the assistance of a statistician, interpreted the data and drafted the article. Fellow researchers, RB and EWV provided input at all stages and revised the protocol and article.

Ethical Standards and Disclosure:

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Health Research Ethics Committee of Stellenbosch University, Cape Town, South Africa (S15/08/164). Written informed consent was obtained from all subjects.

ABSTRACT

The non-communicable disease burden can be addressed through population-wide interventions, including the promotion of healthy diets through the provision of adequate nutrition information on food labels. The study aimed to determine consumer knowledge and reading of nutrition information on food labels; the self-reported impact of food and nutrition labelling on purchasing behaviour; and barriers to and expectations of reading nutrition information. In this cross-sectional descriptive study, an interviewer-administered electronic survey was conducted on adult consumers (N=960) at 16 randomly selected grocery stores (from the four main food retailers in South Africa) in four health districts of Cape Town, Western Cape, South Africa. Only 36.0% of participants indicated that they frequently/always read nutrition information on food labels. Older individuals ($p<0.05$), white participants ($p<0.001$), those with a higher level of education ($p<0.001$) and income ($p<0.001$) read nutrition information more frequently. The main reasons for not reading nutrition information included buying the same type of product all the time (34.28%) and not being interested in the nutrition information (31.44%). The mean food and nutrition label knowledge score was 44.4% (fair or below average) with those that often read the nutrition information on labels having a significantly higher score ($p<0.01$). Main factors influencing food purchasing behaviour included price (81.25%), sell-by date (89.16%) and products on special/promotion (87.08%). Participants would prefer less complex terminology (79.69%), more pictures/colours (71.15%), a single health endorsement logo (73.33%) and bigger font sizes (69.17%) to be used on food labels. Cape Town consumers have poor food and nutrition label knowledge and do not regularly read nutrition information on labels. This could explain why nutrition information was not mentioned as an important determinant of food purchasing. More should be done to educate consumers on utilizing the nutrition information on food labels to make healthier food choices and to simplify food labels for consumers.

KEY WORDS

Food labelling

Nutrition

Consumer

Knowledge

Non-communicable disease

South Africa

INTRODUCTION

With the global population of people living with non-communicable diseases (NCDs) having increased rapidly in recent decades (World Health Organization, 2013), population-based approaches positively influencing consumer diet and promoting healthier eating have gained attention (European Food Information Council, 2016). Nutrition labelling, the section of information on a food label that declares nutrient content, can potentially aid consumers in making healthier food choices (Food and Agriculture Organization of the United Nations and World Health Organization, 2007) and create a food-selection environment that is more conducive to healthy eating (Bovell-Benjamin and Bromfield, 2010), thus contributing to the achievement of public health goals (Hawkes, 2004).

South Africa (SA) is currently bearing a quadruple burden of disease (Bradshaw *et al*., 2003). Although infectious diseases linked to poverty and undernutrition, the effect of the HIV/AIDS epidemic, and the number of injury-related deaths remain a major concern, NCDs associated with overnutrition and the adoption of a Western-type diet are on the increase owing to the nutrition transition. Many South Africans over-consume dietary fat, and added sugar, and consume low amounts of micronutrients (Mchiza *et al*., 2015; Vorster *et al*., 2014). According to the South African National Health and Nutrition Examination Survey (SANHANES-1), approximately one quarter of South African women are overweight and 4 out of 10 are obese (Shisana *et al*., 2013).

In response to the increasing NCD rates globally, many governments are implementing multi-faceted policy interventions (Lachat *et al*., 2013) and revising their labelling and nutrition regulations as a means not only to meet food safety requirements but also as a government best practice for tackling nutrition-related NCDs (Department of Health, 2013; Hawkes, 2010). In SA, the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013–2017 states that the realisation of the overall health sector goal of "a long and healthy life for all" through prevention and control of NCDs requires the promotion of health and wellness at population, community and individual level (Department of Health, 2013). To support this national strategy and to align with international standards and guidelines, the South African

government published the Regulations Relating to the Labelling and Advertising of Foodstuffs (No. R. 146) in 2010 (Department of Health, 2010), coming into effect in 2012. The legislation was intended to act as interim legislation pending the adoption of more comprehensive labelling legislation. In 2014, proposed amendments to this legislation were published for comment. The draft legislation proposed several changes to the current legislation, including mandatory nutrition labelling as well as regulations on various health and slimming claims based on nutrient profiling (Department of Health, 2014).

Limited research has been done in SA since the implementation of the current labelling legislation to determine the knowledge of consumers regarding the nutrition information provided on food labels and whether consumers read and use this information in their decision making. The majority of research has been done in the Gauteng and North West provinces of the country, with the exception of one national study (Bosman *et al*., 2014; Van der Colff e*t al*., 2016; Van der Merwe *et al*., 2014; Van der Merwe *et al*., 2013). No research has been done to date focusing on consumers residing in the Western Cape province of SA. SA is a country of severe contrasts, extending from industrialised cities and Westernised cultures to rural areas with traditional African lifestyles (Vorster, 2002). The nine provinces in SA differ significantly with regard to population size and groups, literacy levels, language and access to housing, electricity and sewage. As the second largest city in SA (Statistics South Africa, 2017), the city of Cape Town consists of various ethnic groups, people with severe income and educational inequalities (Steyn *et al*., 2006) and individuals with different backgrounds, lifestyles, cultures and eating patterns.

The majority of studies conducted in SA found that consumers were mostly positive about the information provided on food labels (Bosman *et al*., 2014; Van der Merwe *et al*., 2013), with the exception of research conducted by Van der Colff *et al*. (2016) who found that some consumers were dissatisfied with the credibility, readability and comprehensibility of food labels.

International consumer research is not directly relevant to the South African environment and the knowledge of food and nutrition labelling of South African consumers and their nutrition label reading habits need to be researched. Only then can effective recommendations be made to improve the food and nutrition labelling of SA food products,

while nutrition labelling strategies can be tailor-made according to consumer preferences to assist them in making healthier food choices.

This research forms part of a larger project conducted on consumers in Cape Town, SA, regarding food and nutrition labelling.

The primary aim of the present study was to perform a situation analysis of consumer knowledge and reading of the nutrition information on food labels in relation to various consumer characteristics. The objectives were to determine consumer food and nutrition label knowledge; to determine the reading of the nutrition information table, list of ingredients, claims and health endorsement logos by consumers when making food purchases; to identify barriers to and expectations of reading food labels; and to assess any relationships between consumer label knowledge, reading, purchasing behaviour and consumer characteristics, including age, gender, level of education and level of income.

METHODS

A cross-sectional descriptive study with an analytical component was conducted. Quantitative data was collected by means of an interviewer-administered electronic survey. Written informed consent was obtained from all consumers who participated in the study.

Sample selection

Study participants consisted of literate (completed Grade 7), adult consumers (≥18 years) who were their households' primary food purchasers (doing >50% of the food shopping for the household), and who did their grocery shopping at selected grocery stores in Cape Town, Western Cape, SA. Only the primary food purchaser was included to ensure that all participants, on a regular basis, came into contact with food labels and made decisions on what food items to buy for the household.

Sampling of grocery stores

Cape Town consists of eight health districts. Four of these health districts were selected for data collection, using purposive sampling. Districts with a better distribution between the three main ethnic groups (compared to other districts where some ethnic groups are poorly represented) were selected for the study, namely, Eastern, Northern, Southern, and Western.

The three main ethnic groups (black African, mixed race and white) constitute 96.7% of the total population in the city (Statistics South Africa, 2017).

A list of grocery stores from the four main food retailers in SA within the chosen health districts was obtained from the respective retailer websites using the "Store Locator" function. One store per retailer for each health district was randomly selected from the list using the Excel random number generation function. If the store was located in an area known for gang violence/crime and thus deemed unsafe for data collection, another store was randomly selected from the list.

Jacobs *et al*. (2011) followed a similar sampling strategy when conducting food label research on consumers in the Potchefstroom area of SA.

In total, 16 grocery stores were selected, four per health district, to ensure an equal number of food retailers per district. As the four major retailers in SA, it was assumed that these retailers stocked food products that mostly complied with the current SA labelling legislation and therefore consumers shopping at these stores would have been exposed to the correct labelling information.

Sampling of participants

Study participants that met the inclusion criteria, and doing their grocery shopping on the day of data collection at one of the selected grocery stores, were invited to participate in the study. Participants were recruited as they exited the grocery store. Once the researcher had finished conducting his/her interview with a participant, the next participant exiting the grocery store was approached. Although convenience sampling was employed to recruit participants, grocery stores were randomly selected, while participants were recruited at different times of the day and different days of the week. This was done in an attempt to incorporate aspects of representativeness into the non-random sample and to include working and non-working participants as well as those that preferred to do their shopping at a specific time of day for whatever reason.

For a cross-sectional descriptive survey the sample size needed can be computed by estimating a proportion/percentage in the population within a certain degree of accuracy. If a power analysis for a single proportion is used, one can detect a difference of 7.4% between

the true value and the estimated proportion with 90% power and with significance level of 5%, when a sample of size 471 is used.

Since participants were stratified into four groups to ensure that different education levels and nutrition information label reading habits were well represented in the study population, a power analysis for a two-way factorial design was employed to check if the overall sample size of 471 would give sufficient power. The four groups in this design consisted of Grade 7–11 nutrition information readers (NIRs), Grade 7–11 nutrition information non-readers (NINRs), Grade ≥12 NIRs, and Grade ≥12 NINRs, where participants were categorised as an NIR if they read nutrition information on labels "sometimes, frequently or always" and as an NINR if they answered "seldom or never". Thus the two factors involved were grade (Grade 7–11, Grade ≥12) and nutrition information label reading (NIRs, NINRs).

Such a power analysis was done to calculate the sample size for a two-way ANOVA (2 x 2) design. The power was set at 90% with an effect size of 0.3 for interaction and a type I error rate of 0.05, giving a minimum sample size of n=118 for each of the four groups and a total minimum sample size of N=472.

Although a minimum sample size of 472 was required to achieve this power for data analysis, a target of N=960 was set (240 participants per health district; 60 participants per selected grocery store) based on the available resources to improve on the power of the test. The smallest sample size obtained per group was n=173 (Grade ≥12 NINRs). For such a sample size per group an effect size of 0.246 for interaction can be detected with 90% power.

Methods of data collection

Five researchers, trained and standardised, collected data over the course of eight weeks by means of an interviewer-administered electronic survey outside the selected grocery stores. Data was collected at each grocery store over the course of six days (four weekdays and two weekend days).

Potential participants were approached as they exited the grocery store and screened for eligibility. If participants met the inclusion criteria, they were fully informed of the aim of the research, of their right to withdraw from the study at any point, and of their anonymity in relation to the study. They were also assured of the confidentiality of the data gathered for the study. Written informed consent was given by all participants and all participants received

a copy of the consent form. Consent forms were available in Afrikaans, English and isiXhosa (the three most common languages spoken in the areas of the study).

The survey, taking approximately 20 minutes to complete, was conducted by the interviewer in a quiet area outside the store. A handheld device or tablet was used to conduct the survey, using the SurveyMonkey® online survey software and questionnaire tool. Back-up paper surveys were available if technical problems, including problems experienced with internet connection, occurred. After completing the survey, participants were thanked for their participation and given a R50 (approximately US$3.75)[ii] food shopping voucher to compensate them for their time.

Data-collection tool: Interviewer-administered survey

The survey was available in English, since English is the main language used on food labels in SA, and participants were required to read nutrition information from an actual food label example for the knowledge section of the survey. The survey questions were compiled by the researcher and based on the research objectives of the study. The survey consisted of six sections: demographic characteristics (section A); lifestyle, behaviour and psycho-social factors (section B); reading of and opinions regarding the importance of nutrition information on food labels (section C); self-reported factors influencing purchasing behaviour (section D); barriers and expectations (section E); and food and nutrition label knowledge (section F). Sections B, C, D and E consisted of a combination of questions adapted from existing questionnaires used in similar studies (Besler *et al*., 2012; Bosman *et al*., 2014; Campos *et al*., 2011;. Jacobs *et al*., 2011; Satia et al., 2005) and newly constructed questions. Sections A-E consisted of close-ended and multiple-choice questions and Likert scales. The knowledge section of the survey was adapted from a knowledge survey compiled by Van der Merwe *et al.* (2013) on South African consumers in Potchefstroom, North West province.

Content validity was done by sending the survey to six experts, who are very knowledgeable in the field of food and nutrition labelling, for comments and recommendations. After adapting the questionnaire according to the comments received, face validity was assessed by performing a pilot study on 20 consumers at a conveniently selected grocery store outside the research areas. Adaptations were made to the survey questions based on the comments

[ii] Conversion done on 14 June 2017

received and notes made by the researchers on the day regarding the flow and clarity of the survey questions, time taken to complete the survey and technical glitches experienced owing to the online nature of the survey. Reliability of the instrument was ensured and improved by standardising the researchers as well as by careful construction of the questionnaire.

For the food and nutrition label knowledge section, participants were given a food label of a well-known South African breakfast cereal and asked to answer questions related to locating information on the label, calculations based on the product, nutrient content claims, and identifying health endorsement logos on the label.

Data analysis

Data from the survey was exported from SurveyMonkey® to Microsoft Excel on a daily basis, while paper surveys (where applicable) were captured by the researcher. STATISTICA Version 13 (2015) was used to analyse the data.

Regression analysis of a continuous response variable versus ordinal input was done and the strength of the relationship was measured with Spearman correlation.

The relationships between continuous response variables and nominal input variables were analysed using appropriate analysis of variance (ANOVA). When ordinal response variables were compared versus a nominal input variable, non-parametric ANOVA methods like Kruskal-Wallis or Mann-Whitney (for two groups) were used.

The relation between nominal variables was investigated with contingency tables and likelihood ratio chi-squared tests.

A p-value of $p<0.05$ represented statistical significance.

The total percentage knowledge scores calculated in phase one were interpreted based on a performance-rating scale developed by Whati *et al*. (2009)

RESULTS AND DISCUSSION

Data is presented according to the objectives of the study and therefore pooled, apart from the nutrition information label reading section, where the three categories of reading frequency (seldom or never; sometimes; frequently or always) were compared to the demographic characteristics of participants.

Participants in the survey numbered 960, 240 per health district with a minimum of 173 per group (*n*=224 Grade 7–11 NIRs; *n*=179 Grade 7–11 NINRs; *n*=384 Grade ≥12 NIRs and *n*=173 Grade ≥12 NINRs), reaching the target of at least 118 participants per group.

Participant demographics and shopping habits

The mean age of participants was 38.13 (SD=14.64, Range: 18–91 years) while the majority (67.70%) were female. This may be due to the fact that research has shown that females are mostly responsible for household food purchases (Van der Merwe *et al*., 2013). The mean number of children per household was 1.69 (SD=1.44), with 2.73 (SD=1.36) adults per household, which is in line with the average household size of 3.3 according to Statistics South Africa (Statistics South Africa, 2017). Half of the participants (50.59%) had a total household monthly income, after deductions, of ≤ R3200. The demographic profile of the participants is given in Table 1.

Table 1: Demographic profile of participants (*N*=960)

	Total		Never or seldom read nutrition information on food label		Sometimes read nutrition information on food label		Frequently or always read nutrition information on food label	
	n	**%**	***n***	**%**	***n***	**%**	***n***	**%**
‡**Sex**								
Male	310	32.29	126	40.65	82	26.45	102	32.90
Female	650	67.71	226	34.77	180	27.69	244	37.54
¥**Age***								
18–29	332	34.58	133	40.06	100	30.12	99	29.82
30–39	271	28.23	99	36.53	74	27.31	98	36.16
40–49	162	16.88	60	37.04	42	25.93	60	37.04
50–59	84	8.75	29	34.52	15	17.86	40	47.62
≥60	111	11.56	31	27.93	31	27.93	49	44.14
‡**Race****								
Black	386	40.50	156	40.41	122	31.61	108	27.98
Mixed Race	367	38.51	133	36.24	95	25.89	139	37.87
White	195	20.46	57	29.23	44	22.56	94	48.21
Asian	5	0.53	3	60.00	1	20.00	1	20.00
‡**Marital status**								
Single	350	36.50	135	38.57	104	29.71	111	31.71
In a relationship	172	17.94	75	43.60	45	26.16	52	30.23
Engaged	17	1.77	6	35.29	5	29.41	6	35.29
Married	328	34.20	110	33.54	85	25.91	133	40.55
Divorced	49	5.11	11	22.45	11	22.45	27	55.10
Widow/widower	43	4.48	15	34.88	12	27.91	16	37.21
¥**Level of education****								
≥ Grade 7	45	4.69	25	55.56	8	17.78	12	26.67
Grade 8–11	358	37.29	154	43.02	96	26.82	108	30.17
≥Grade 12	326	33.96	116	35.58	96	29.45	114	34.97
Diploma/Degree	231	24.06	57	24.68	62	26.84	112	48.48
‡**Employment status**								
Part /Full time	706	73.54	251	35.33	206	29.18	249	35.27
Unemployed	119	12.40	55	46.22	24	20.17	40	33.61
Pensioner	65	6.77	20	30.77	14	21.54	31	47.69
Housewife	38	3.96	13	34.21	7	18.42	18	47.37
Student	32	3.33	13	40.63	11	34.38	8	25.00

¥**Total household income after deductions****								
No income†	59	7.53	33	55.94	13	22.03	13	22.03
R1–R1600	177	22.58	80	45.20	30	16.95	67	37.85
R1601–R3200	161	20.54	59	36.65	45	27.95	57	35.40
R3201–R6400	184	23.47	69	37.50	59	32.07	56	30.43
R6401–R12800	81	10.33	23	28.39	28	34.57	30	37.04
R12801–R25600	74	9.44	21	28.38	23	31.08	30	40.54
R25601–R51200	31	3.95	7	22.58	6	19.36	18	58.06
R51201–R102400	12	1.53	0	0.00	3	25.00	9	75.00
≥R102401	5	0.64	3	60.00	0	0.00	2	40.00
‡**Special diet****								
Yes	243	25.31	60	24.69	63	25.93	120	49.38
No	717	74.69	292	40.73	199	27.75	226	31.52
‡**Vitamin or mineral supplement use****								
Yes	209	21.77	45	21.53	60	28.71	104	49.76
No	751	78.23	307	40.88	202	26.90	242	32.22
‡**Suffering from a chronic disease**								
Yes	216	22.50	70	32.41	63	29.16	83	38.43
No	744	77.50	282	37.90	199	26.75	263	35.35

†Cut-off values used according to SA Census 2011 data (Statistics South Africa, 2010)
¥Kruskal-Wallis
‡Likelihood ratio chi-square test
*$p<0.05$ statistically significant
**$p<0.001$ highly statistically significant
Note: The totals are column percentages and the remaining percentages are row percentages.

Approximately a third (34.03%) of participants shopped for food on a weekly basis, 26.96% shopped for food on a monthly basis, 22.96% two to six times per week and 16.91% indicated that they shopped for food daily. These results show more frequent food shopping compared with other research conducted in SA after the implementation of the new labelling regulations (Van der Colff *et al.*, 2016; Van der Merwe *et al.*, 2013). The majority of participants always (31.14%) or often (33.30%) shopped for food at the same grocery store. This may be due either to convenience or indicate customer loyalty to particular retailers.

Reading of nutrition information on food labels

When purchasing a food or non-alcoholic beverage, 36.67% of participants never or seldom read the nutrition information on the food label, 27.29% sometimes did, while 36.04% indicated that they frequently or always read the nutrition information. These results are in contrast with a systematic review, including 120 articles from mostly First-World countries, conducted by Campos *et al*., (2011) who found that the regular use of nutrition information on food labels among the general population was generally high and typically above 50%. Nutrition information label reading in this particular population was, however, similar to other studies conducted in SA (Kempen *et al.*, 2012; Van der Colff *et al*., 2016; Van der Merwe *et al*., 2013).

The three nutrition information label reading categories (seldom or never; sometimes; frequently or always) were compared to several demographic characteristics (Table 1). Although an answer of "sometimes, frequently and always" classified a participant as a nutrition information reader, the information of the "sometimes" group is presented and analysed separately from the "frequently and always" group for completeness. It was found that significantly more older individuals ($P<0.05$), white individuals ($P<0.001$), those with a higher level of education ($P<0.001$) and higher income ($P<0.001$) read the nutrition information provided on labels more frequently.

These results are similar to findings from international research, with the exception of the age of nutrition information label readers where the majority of studies found that middle-aged or younger adults were more likely to read the nutrition information on food labels. This research did not find any statistically significant difference between men and women regarding label reading as reported in several research studies (Campos *et al*., 2011).

Individuals with healthier eating habits have reported greater use of the nutrition information on food labels, either because of the requirements of a diet or personal preference. Research has also shown that supplement use is associated with the use of the nutrition information on food labels (Campos *et al*., 2011). This research had similar findings, showing that those who follow a special diet ($P<0.001$) or use vitamin and/or mineral supplements ($P<0.001$) read the nutrition information on labels more often.

When asked about the importance of the nutrition information provided on a food label, 68.23% of participants said that it was important to them when buying a product for the first time, confirming earlier research (Jacobs *et al*., 2011; Van der Merwe *et al*., 2013). However, 62.40% of participants said it was unimportant when buying known brands.

The three most popular reasons for reading the nutrition information on food labels posed to NIRs (*n*=608) included: "To compare amounts of nutrients in different foods" (22.69%); "to determine the amount of a nutrient in a serving of food" (21.10%) and "to compare nutrient content in different brands of the same food" (19.57%). According to two-thirds (67.04%) of these participants, nutrition label reading took place in the store, while 27.30% read the information at home and only 5.66% researched the information before going to the store or read it before using the product.

A summary of reasons why participants who seldom or never (*n*=352) read the nutrition information on food labels is provided in Figure 1 (participants were allowed to give more than one answer). More than a third of participants indicated that the main reasons for not reading nutrition information on labels were that they "buy the same type of product all the time" (34.28%) or that they were "not interested in the nutrition information provided on food labels" (31.44%). These findings are similar to those from a review of research from the global South conducted by Mandle *et al*. (2015), who found that a lack of interest in nutrition labelling, time and difficulty in understanding the information were some of the main reasons consumers do not read the nutrition information provided on food labels.

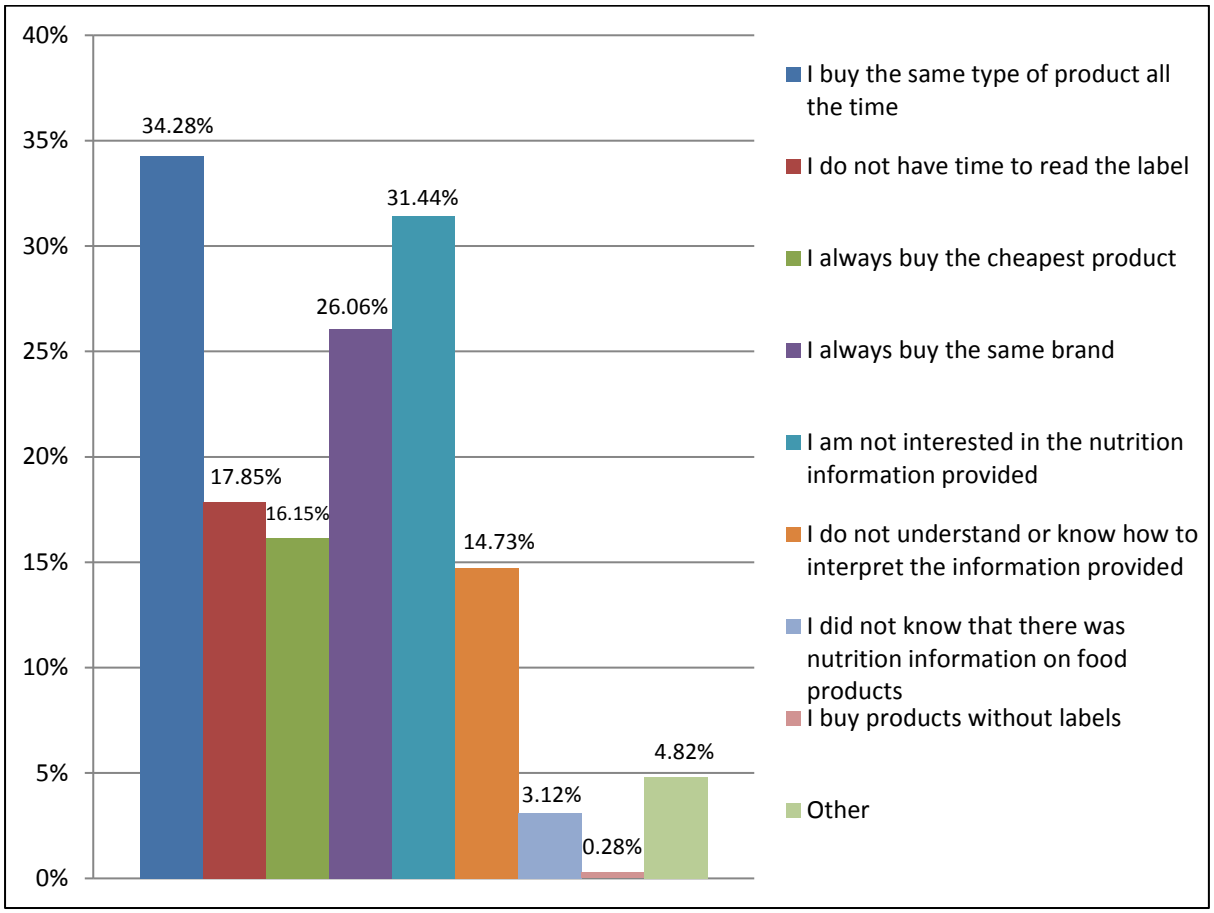


Figure 1: Reasons given for not reading the nutrition information on food labels (*n*=352)

Participants were asked to indicate how often they specifically read the information provided in the nutrition information table and the list of ingredients, as well as nutrient content and health claims. Reading frequency was below 60% for those who indicated they read the information sometimes, frequently or always (54.27% for the table, 55.63% for the list of ingredients, and 57.92% for nutrient content and health claims respectively).

Participants who indicated that they read the nutrition information table either sometimes, frequently or always (*n*=521), mainly focused on the energy (56.81%), total fat (42.80%), protein (41.07%), sugar (37.04%), and vitamin and mineral (35.70%) content of the food product. This confirms the findings of Shine *et al*. (1997) that consumers tend to look more closely at nutrients they wish to avoid. Of those indicating that they read the vitamin and mineral content of the product either sometimes, frequently or always (*n*=186), 62.9% said that they looked at the combination of the various vitamins and minerals, while 25.81% said it depended on the type of product they were buying.

More than two-thirds (65.17%) of participants who read the list of ingredients either sometimes, frequently or always (*n*=534) indicated that it was to see what the composition of the product was (Figure 2).

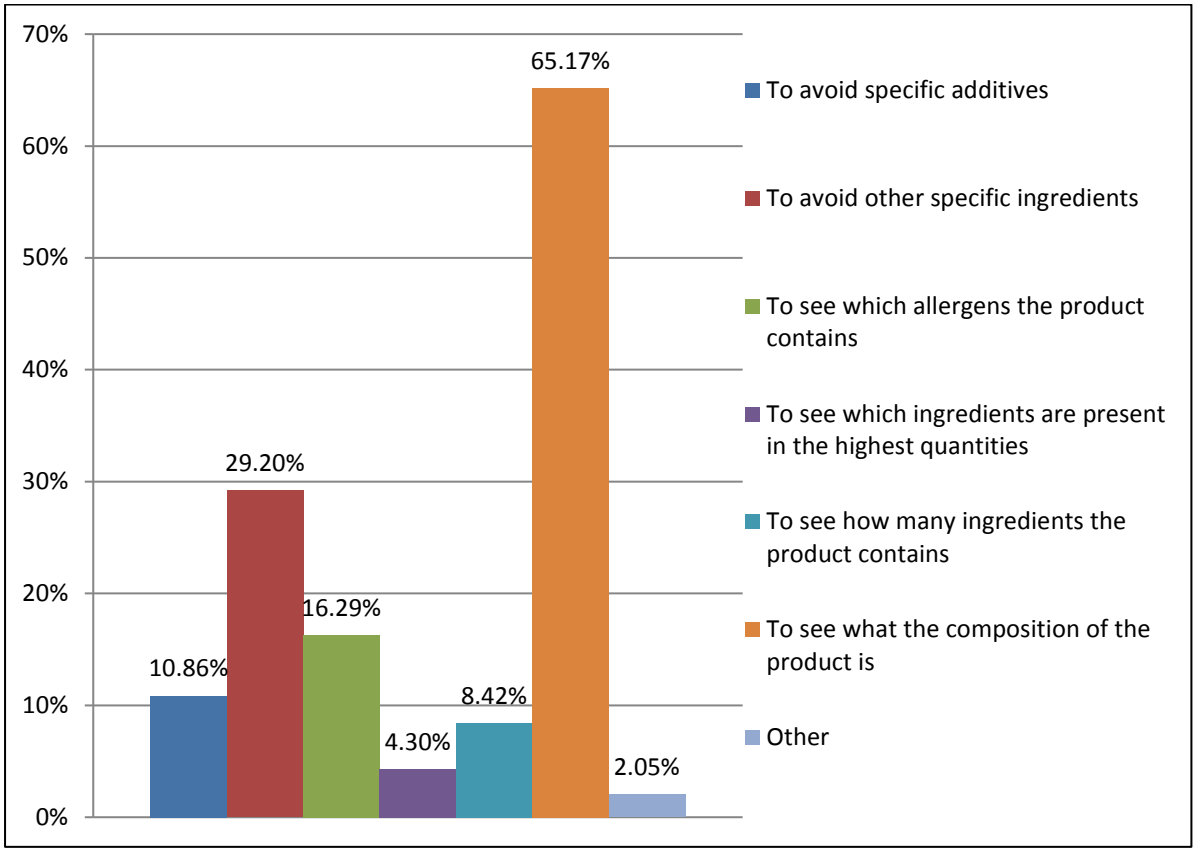


Figure 2: Reasons given for reading the list of ingredients (*n*=534)

Sugar and fat claims were by far the most important claims (44.6% and 52.70% respectively) for participants who read claims sometimes, frequently or always (*n*=556) when purchasing a food product. Glycaemic index/load-related claims, health function claims, disease function claims and slimming claims were important to only a small percentage of participants (only 4.32%, 7.91%, 3.78% and 3.78% respectively) (Table 2).

Table 2: Importance of nutrient content and health claims for participants who read claims sometimes, frequently or always (*n*=556)

Nutrient content and health claims	*n*	%*
Fat claims e.g. "Low in total fat"	293	52.70
Sugar claims e.g. "Sugar free"	248	44.60
Protein claims e.g. "High in protein"	116	20.86
Energy claims e.g. "High in energy"	111	19.96
Dietary fibre claims e.g. "Source of dietary fibre"	111	19.96
Vitamins e.g. "Source of vitamin C"	108	19.42
Cholesterol e.g. "Low in cholesterol"	83	14.93
"High in carbohydrates"	60	10.79
Minerals e.g. "Source of calcium"	58	10.43
Sodium e.g. "Low in sodium"	49	8.81
Claims for a nutrient which relates to a health function e.g. "Vitamin A is necessary for normal vision"	44	7.91
Omega-3 fatty acids e.g. "Source of omega-3 fatty acids"	42	7.55
Claims related to Glycaemic Index (GI) and/or Glycaemic Load (GL)	24	4.32
Claims for a nutrient which relates to a disease function e.g. "Diets low in sodium may reduce the risk of blood pressure"	21	3.78
Slimming claims	21	3.78

*ranked in descending order based on percentage value

Almost half (49.17%) of all participants said they would buy a food product based on the presence of a health endorsement logo such as the heart symbol of the Heart and Stroke Foundation South Africa and the CANSA Smart Choice Seal, while 10.52% said they would consider it. Six out of ten (59.58%) participants indicated "yes" when asked if they would prefer a single health endorsement logo to be used on all food products, while 11.04% indicated "maybe". This has been emphasised in previous research that found that food and nutrition labelling can be more effective if simple graphics, symbols, and logos are used (Hawley *et al*., 2013; Wills et al., 2009).

Food and nutrition label knowledge

The food and nutrition label knowledge section of the questionnaire consisted of 11 questions with four sub-sections based on the label shown to the participants. The total mean knowledge score (determined by calculating the mean of the individual participant knowledge scores for all questions) for all participants was 44.4% ± 31.8% (Table 3) which is considered

'fair or below average knowledge' based on a performance-rating scale for knowledge developed by Whati *et al.* (2009). The knowledge scores obtained were considerably lower than those of consumers in Potchefstroom, SA; however, this could possibly be attributed to the differences in the respective participant demographics, particularly level of education and level of income (Van der Merwe *et al*., 2013). It should be highlighted that the mean knowledge score should be interpreted with caution as the knowledge section of the survey did not include all relevant aspects of knowledge related to food and nutrition labelling and it did not measure understanding.

Table 3: Frequencies of correct responses to questions regarding food and nutrition label knowledge (*N*=960)

Question	*n*	%	*Interpretation*
Locating information			
How much saturated fat is in 100g of this food?	463	48.23	Below average/fair
What is the main ingredient of this product?	588	61.25	Above average/very good
Consumers with what type of intolerance/allergy should avoid this product?	368	38.33	Below average/fair
Mean score*		49.3±38.2	Below average/fair
Calculations based on product			
If you ate 100g of this food, how much total sugar would you consume?	552	57.50	Average/good
If you ate one serving of this food, how much dietary fibre would you consume?	388	40.42	Below average/fair
How many servings of the product can you get from this box?	160	16.67	Very poor
Mean score*		38.2±35.2	Below average/fair
Nutrient content claims – identify the nutrient content claims made on the product			
High in fibre	514	53.54	Average/good
Source of vitamin B1, B2 and niacin	489	50.94	Below average/fair
Source of iron	463	48.23	Below average/fair
Mean score*		50.9±47.6	Below average/fair

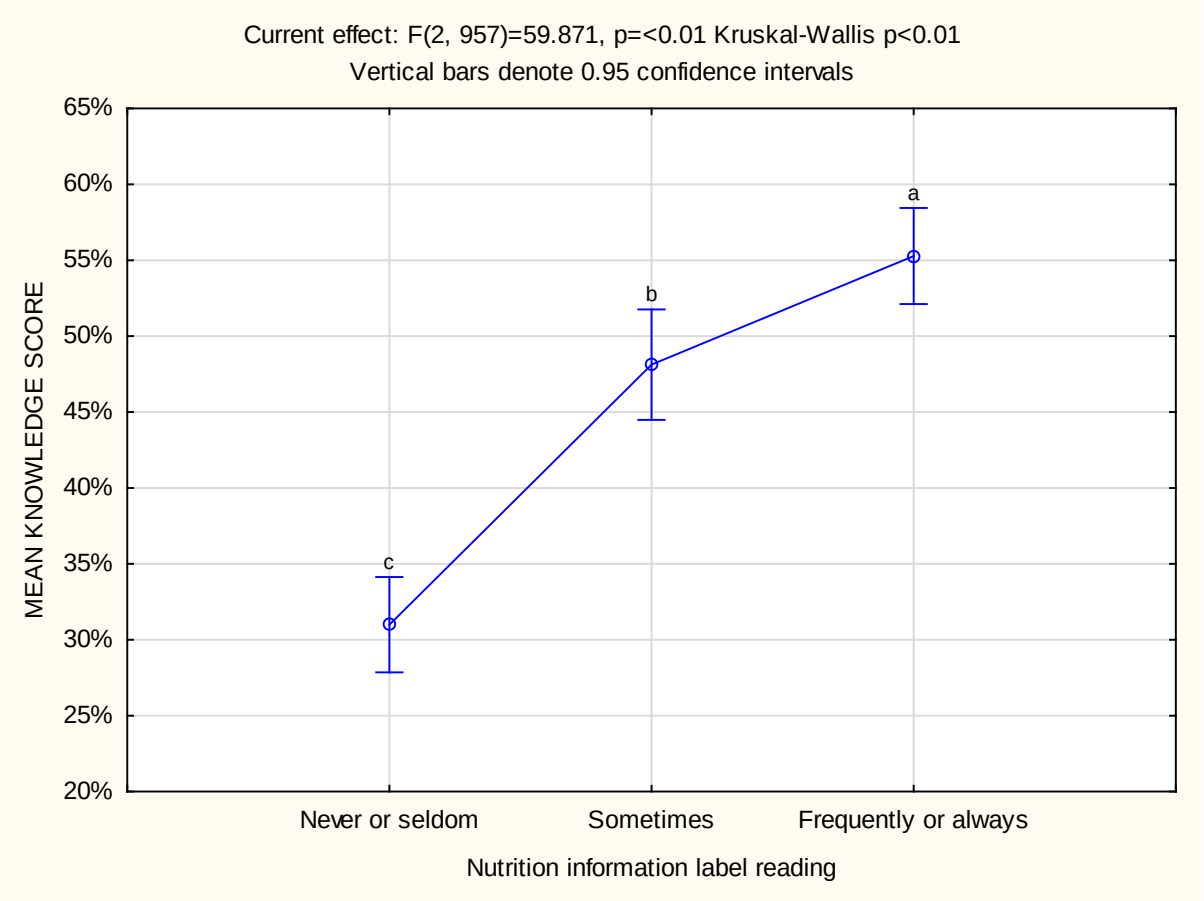
Health endorsement logos – please identify the health endorsement logos on the product			
Heart and Stroke Foundation Heart Mark	396	41.25	Below average/fair
CANSA Smart Choice Seal	310	32.29	Very poor
Mean score*		36.8±41.3	Below average/fair
TOTAL mean score#		**44.4±31.8**	**Below average/fair**

*Mean score determined by calculating the mean of individual participant knowledge scores per sub-section

#Total mean score determined by calculating the mean of individual participant knowledge scores for all 11 questions

Sixty-one percent of participants could correctly identify the main ingredient of the product – this question scored the highest percentage correct answers. For all other questions, the frequency of correct responses was less than 58%. Only 16% of participants could calculate the correct number of servings in the box according to the information provided on the label. This is alarming, as nutrition information on labels is provided according to serving size and 100g, which could lead to incorrect nutrient calculations made by consumers and/or amount of the product consumed.

There was a significant positive correlation between food and nutrition label knowledge and level of education ($P<0.001$, $r=0.48$) and income ($P<0.001$, $r=0.43$). Women achieved significantly higher ($P<0.05$) knowledge scores (total mean score: 45.9%) than men (total mean score 41.2%), as well as individuals without children (mean score: 51.6% vs. 42.1%) ($P<0.01$). As expected, participants who indicated that they read nutrition information on food labels frequently or always, obtained significantly higher ($P<0.01$) knowledge scores (mean score: 55.2%) than those that read labels sometimes (mean score: 48.1%), or seldom or never (mean score: 30.9%) as shown in Figure 3. These results are similar to findings from international research (Campos *et al*., 2011).



*different letters (a, b and c) above the confidence intervals indicate that the means are all significantly different

Figure 3: Mean knowledge scores and nutrition information label reading frequency

It is clear from this research that there are differences in the food and nutrition label knowledge of consumers from different consumer demographics. Educational programmes should therefore be tailored to specific subgroups of the population, including but not limited to different levels of education and income.

Food labelling factors influencing purchasing behaviour

Food labelling factors that influence purchasing behaviour of participants are shown in Table 4. Sell-by date, specials/promotions and price are the three factors that influence the majority of participants (89.16%, 87.08% and 81.25% respectively) with every purchase. With regard to the nutrition information provided on the label, approximately half of participants indicated that the ingredient list would influence their purchase of a product, while less than half (47.08%) said that the nutrition information table and nutrition and health claims

(42.81%) would influence their food purchases. Only one-third of participants (33.23%) indicated that the presence of one or more health endorsement logos would influence their purchasing behaviour.

Poor food and nutrition label knowledge and infrequent use of nutrition information on food labels could explain why nutrition information (including the table, ingredients, claims and logos) was not mentioned as an important determinant of food purchasing for these participants.

Table 4: Various aspects of food labels influencing purchasing behaviour of consumers (*N*=960)

	Yes		Sometimes		No	
Factor	***n***	**%***	***n***	**%**	***n***	**%**
Sell-by/Best before date	856	89.16	30	3.13	74	7.71
Specials/Promotions	836	87.08	65	6.77	59	6.15
Price	779	81.15	123	12.81	58	6.04
Manufacturer or brand	559	58.23	111	11.56	290	30.21
Preparation/Cooking instructions	555	57.81	80	8.33	325	33.86
Convenience	506	52.71	64	6.66	390	40.63
Total volume/grams	505	52.61	70	7.29	385	40.10
Ingredients	499	51.98	127	13.23	334	34.79
Recipes provided	470	48.96	93	9.69	397	41.35
Nutrition information table	452	47.08	135	14.06	373	38.86
Type of packaging	420	43.75	102	10.62	438	45.63
Claims	411	42.81	118	12.29	431	44.90
Environmentally friendly statements	379	39.48	79	8.23	502	52.29
Organic/Free-range claims	329	34.27	80	8.33	551	57.40
Allergens	322	33.54	43	4.48	595	61.98
Health-endorsement logos	319	33.23	122	12.71	519	54.06
Preservatives	310	32.29	75	7.81	575	59.90
Serving size	291	30.31	45	4.69	624	65.00
Genetically modified-related claims	180	18.75	38	3.96	742	77.29

*ranked in descending order based on percentage “yes” answers

Barriers and expectations regarding the reading and understanding of food labels

Figure 4 provides a list of barriers to reading and understanding food labels. It is clear that the majority of participants find it difficult to interpret the different health endorsement logos used on food labels (42.92% indicated yes; 15.94% indicated sometimes). This may be due to the many different types of health endorsement logos found on South African products.

Many also find it difficult to understand the nutrition information provided in the nutrition information table (42.71% indicated yes; 15.52% indicated sometimes). This confirms research done previously which found that in general consumers have difficulty with the quantitative information presented on food labels (Campos *et al*., 2011).

These two barriers were significantly more common among participants with a lower level of education ($P<0.001$ and $P<0.001$ respectively), lower level of income ($P<0.001$ and $P<0.01$ respectively) and those who achieved lower food and nutrition label knowledge scores ($P<0.01$ and $P<0.01$ respectively) (results not shown), also confirming previous research (Campos *et al*., 2011).

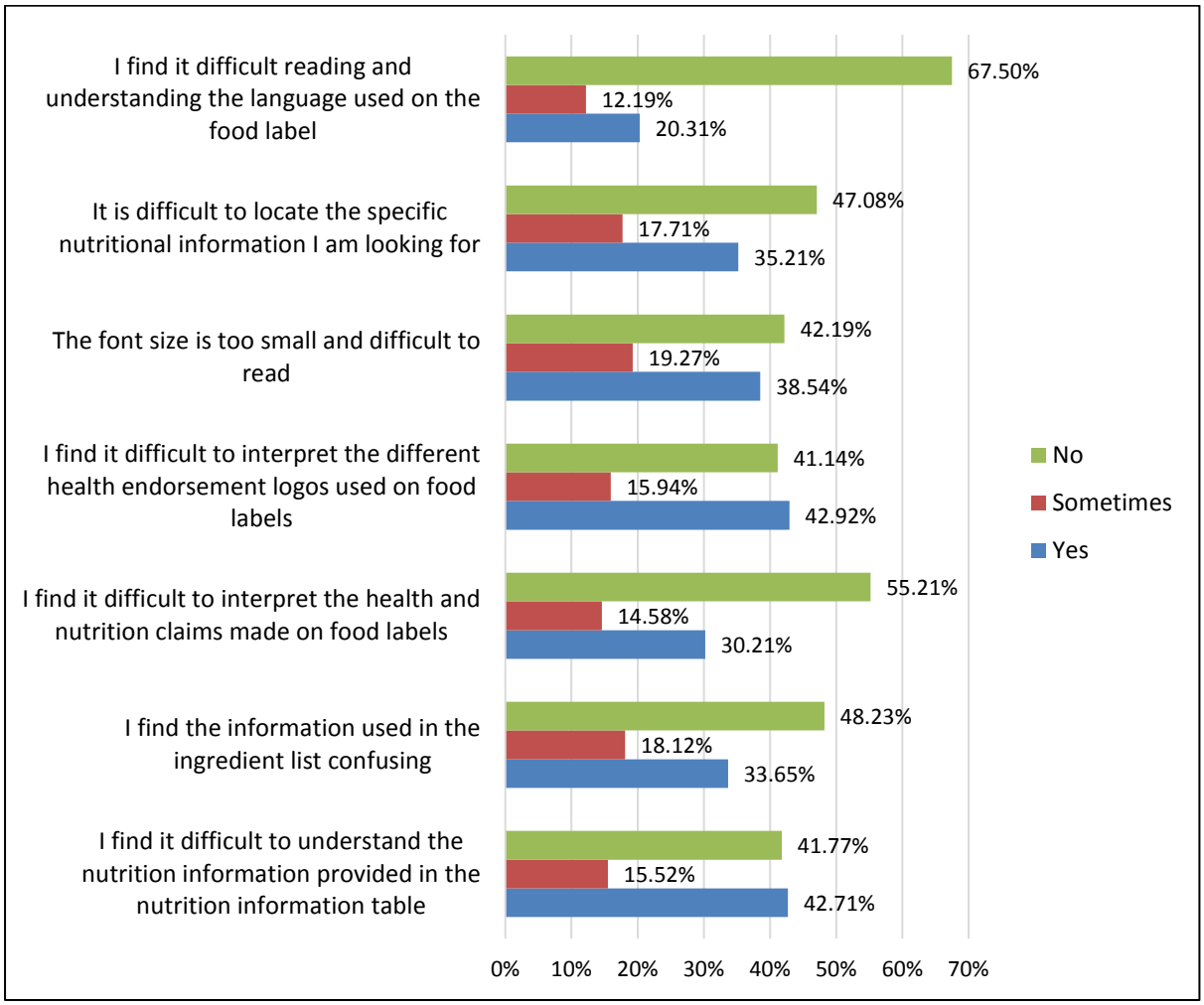


Figure 4: Barriers to reading and understanding food labels (*N*=960)

Participants were also asked to list any factors that could help them in reading and understanding the information provided on food labels. By far the majority of participants (79.69%) said that they would prefer labels with less complex terminology, a single health endorsement logo for all healthy foods (73.33%), more pictures and colour (71.15%) and larger font sizes (69.17%) on products.

CONCLUSION

This research found that participants from the Western Cape, SA, do not regularly read the nutrition information provided on food labels and therefore do not consider nutrition information on food labels as one of the most important factors when purchasing a food product. Food and nutrition label knowledge of the participants was fair, and as expected, those with a higher level of education and income read the nutrition information on labels

more often and had a better knowledge and understanding of nutrition labels. Although some participants were not interested in the nutrition information provided on labels or indicated that they buy the same food products all the time, this research has once again shown that consumers struggle with the amount and complexity of nutrition information provided on food labels and would prefer simpler labels with more colour, pictures and a single health endorsement logo used on all food products.

Considering that non-random sampling was used to recruit participants at the grocery stores, care should be taken to extrapolate the research findings to all consumers in the Western Cape and SA, especially those from rural areas. This study has however given unique insight into the nutrition label knowledge and reading habits of this particular population, which consist of consumers from different levels of education and relatively low income groups.

This study did not include illiterate consumers, as the majority of consumers in Cape Town are literate (>90%) (City of Cape Town, 2017) and participants were required to read information from a food label for the survey. It is therefore recommended that similar research be conducted on a larger scale on literate and illiterate consumers and those living in rural areas from the Western Cape and other provinces in SA.

It is important to note that this study investigated consumers' self-reported nutrition label reading frequency and factors influencing food purchasing behaviour and that actual nutrition label use was not determined. It is recommended that further research be conducted to determine actual label use by using a data collection technique such as verbal protocol analysis as described by Higginson *et al*. (2002).

The findings from this research, however, along with findings from research conducted in other provinces of SA, can assist researchers and the South African government in designing education campaigns to motivate more frequent label reading, targeting specific subgroups of the population. Educating consumers on the importance of the nutrition information and how to use the information correctly, can increase the selection of healthier food options.

Finding solutions to the barriers consumers experience when reading nutrition information on food labels and their expectations with regard to food label formats, should be further explored using a qualitative approach in order to make meaningful recommendations to improve nutrition labelling strategies and formats in SA.

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Chapter 5

Research Article: Price rather than nutrition information the main influencer of consumer purchasing behaviour in South Africa – A Qualitative study

PRICE RATHER THAN NUTRITION INFORMATION THE MAIN INFLUENCER OF CONSUMER FOOD-PURCHASING BEHAVIOUR IN SOUTH AFRICA – A QUALITATIVE STUDY

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Authorship:

The principal researcher, NK, developed the idea and the protocol for this research study, planned the research, undertook data collection (with the assistance of trained research assistants), captured the data for analyses, analysed the data with the assistance of a statistician, interpreted the data and drafted the article. Fellow researchers, RB and EWV provided input at all stages and revised the protocol and article.

Ethical Standards and Disclosure:

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Health Research Ethics Committee of Stellenbosch University, Cape Town, South Africa (S15/08/164). Written informed consent was obtained from all subjects.

ABSTRACT

The non-communicable disease burden can be addressed through population-wide interventions, including the promotion of healthy diets through the provision of adequate nutrition information on food labels. This study aimed to explore the self-reported factors that influence food purchases of consumers and the reasons why consumers read or ignore the nutrition information on food labels, and to investigate the expectations of consumers regarding food and nutrition labelling. Focus-group discussions were held with adult consumers in Cape Town, South Africa. Food price was sometimes the only consideration when selecting food products, irrespective of their quality and nutritional value. Taste, brand loyalty, marketing, and convenience were also major influencers for some, while family, culture and religion emerged as important external factors when making purchasing decisions. With regard to the nutrition information on food labels, the list of ingredients, nutrient content claims and specific health-endorsement logos were considered important. Reasons for reading nutrition information were mainly to assess the nutritional value or health properties of the product, to avoid certain ingredients/allergens and to determine product quality. Participants struggled to understand the information provided on food labels, specifically the nutrition information table. A lack of time or interest, price concerns and trust in food labelling information also emerged as reasons why participants ignore nutrition information on labels. There is a need for simpler food labelling, more graphics and symbols, and less complex terminology, information overload and quantitative information. It is recommended that a standardised front-of-package labelling scheme and a single health-endorsement logo for South Africa, to be used on healthy food products, be considered. The expectations of participants can assist food manufacturers and government to improve food labels. More should be done to educate consumers on utilising the information on food labels correctly, in order for them to make healthier food choices.

KEY WORDS

Food labelling

Nutrition

Consumer

Purchasing behaviour

Barriers

South Africa

INTRODUCTION

In 2010, the South African government published Regulations relating to the labelling and advertising of foodstuffs (R146) (Department of Health, 2010). The intention of this new legislation was to ensure that South Africans have access to honest and accurate food labels by closing known loopholes which might allow misleading labelling and advertising. These regulations came into effect two years after publication and were intended as interim legislation pending the adoption of more comprehensive labelling legislation at a later stage. In 2014, Regulations relating to the labelling and advertising of foods: Amendment (R429) were published for comment (Department of Health, 2014). The draft regulations include (amongst others) mandatory nutrition information labelling as well as regulations on nutrient content claims, health claims, function claims, reduction of disease risk claims and slimming claims based on nutrient profiling. One of the key objectives behind this comprehensive draft legislation is the promotion of healthier eating habits through improved labelling and advertising, thereby encouraging better food choices in order to improve the health of South Africans (Wicks, 2012).

In South Africa (SA), industrialisation, economic and nutrition transition are conspiring with population demographic change, leading to a major rise in non-communicable diseases (NCDs) (Vorster *et al*., 2011; Baleta and Mitchell, 2014; Statistics South Africa *et al*., 2017). In response to this rise in NCDs, the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013–2017 of the Department of Health, set out a detailed plan for achieving specific targets with time frames. According to the plan, the realisation of the health sector goal of "a long and healthy life for all" through prevention and control of NCDs can be achieved with the implementation of three major components, the first being the prevention of NCDs and the promotion of health and wellness at population, community and individual level (Department of Health, 2013a). Nutrition labelling, the section of information on a food label that specifically declares nutrient content (nutrition information table) (Bovell-Benjamin and Bromfield , 2010), can be seen as a relatively low-cost tool and a "best buy" intervention,

according to the World Health Organization, which can potentially assist in reaching this goal (World Economic Forum and World Health Organization, 2011).

SA has a divergent and emerging consumer market, and studies on food and nutrition labelling are important owing to consumer differences (Kempen *et al*., 2011). As the second largest city in SA (Statistics South Africa, 2017), the city of Cape Town consists of various ethnic groups, people with severe income and educational inequalities (Steyn *et al*., 2006; Statistics South Africa, 2017) and individuals with different backgrounds, lifestyles, cultures and eating patterns.

Limited research has been done in this country since the implementation of the current labelling legislation to explore whether the nutrition information on food labels influences consumer purchasing behaviour and to determine why consumers read or choose to ignore the nutrition information provided on food labels. The majority of research has been done in the Gauteng and North West provinces of the country, with the exception of one national study (Van der Merwe *et al*., 2013; Bosman *et al*., 2014; Van der Merwe *et al*., 2014; Van der Colff *et al*., 2015). Most of these studies were of a quantitative nature, apart from a few exploratory studies conducted in Potchefstroom, North West province (Van der Merwe *et al*., 2010; Kempen *et al*., 2011; Venter *et al*., 2011), although qualitative research methods have been successfully utilised in previous international research to explore food labelling issues (Zarkin and Anderson, 1992; Higginson *et al*., 2002).

In light of the complexity of the consumer decision-making process and the various internal and external factors influencing purchasing behaviour, a qualitative research approach can add value to the existing body of knowledge to further elucidate the complex questions of whether and how food labels influence consumer purchasing behaviour and how consumers utilize the nutrition information on food labels, as it investigates *how* and *why* individuals act in certain ways (Swift and Tischler, 2010). This knowledge is necessary to make appropriate recommendations to improve the nutrition information on food products and nutrition labelling strategies in SA.

The objectives of this study were to explore the self-reported internal and external factors that influence food purchases of consumers; to explore the reasons why consumers read or

ignore the nutrition information on food labels; and to investigate the expectations of consumers regarding nutrition information and food labelling in general.

MATERIAL AND METHODS

The present study was conducted within a qualitative paradigm using an interpretative phenomenological approach. The purpose of research in interpretivism is understanding and interpreting everyday events, experiences and social structures and the values people attach to these phenomena (Collis and Hussey, 2009; Rubin and Babbie, 2010). It is concerned with understanding the world as it is from the subjective experiences of individuals (Skinner, 2007). This approach was selected as it best suited the objectives of the study. The focus-group discussion (FGD) is a qualitative research method used since the mid-20th century. It has been used extensively for exploring issues related to brand imaging, packaging and product choice (Finch and Lewis, 2003) and can gather accurate information about the preferences of consumers. Data gathering for this study was therefore done through FGDs with participants from Cape Town, Western Cape, meeting the inclusion criteria. Permission to conduct the study was obtained from the Health Research Ethics Committee of Stellenbosch University, Cape Town, SA (S15/08/164). Written informed consent was obtained from all participants who participated in the study.

Sampling of participants

Study participants consisted of literate (completed Grade 7), adult consumers (≥18 years) who were their households' primary food purchasers (doing >50% of the food shopping for the household), recruited from grocery stores in the City of Cape Town, Western Cape, SA. Only the primary food purchaser was included to ensure that all participants, on a regular basis, came into contact with food labels and made decisions on what food items to buy for the household.

Participants who participated in an interviewer-administered electronic survey on food and nutrition labelling in Cape Town during February and March 2016 were approached for participation in FGDs conducted during May and June 2016. Survey participants were recruited from 16 randomly selected grocery stores from the four major food retailers in SA in four of the eight health districts of the City of Cape Town. More information on the

sampling of the grocery stores is described elsewhere (Koen *et al*., submitted for publication to the *International Journal of Consumer Studies*).

Participants were stratified into four groups according to their education level and whether they read the nutrition information on food labels or not, as determined during the interviewer-administered electronic survey (Koen *et al*., submitted for publication). The four groups consisted of Grade 7–11 nutrition information readers (NIRs); Grade7–11 nutrition information non-readers (NINRs); Grade ≥12 NIRs; Grade ≥12 NINRs.

Methods of data collection

After the completion of the baseline survey, participants were asked whether they would like to participate in discussions to further explore their label-reading habits. If they were interested, they provided their names and contact details to the researchers on a separate screening form that also included their education level, language preference and frequency of reading the nutrition information on food labels. Participants were purposefully selected for the respective FGDs according to their education level, whether they read the nutrition information on food labels (as different discussion questions were posed to label readers and non readers), their language preference, and the health district in which they resided in. The language preference of a participant and the health district in which they resided was considered for practical reasons in order to arrange the FGDs. The health district where the participant resided was considered to ensure that the location of the FGDs was convenient for the participant and that they did not have to travel far for the discussion. Language preference was considered in order to conduct the FGDs in only one language. This was done to ensure that participants could understand one another and express themselves freely without experiencing any language barriers.

FGDs were conducted in Afrikaans and English. The option to conduct the FGDs in isiXhosa was available; however all but two participants indicated English or Afrikaans as their language of preference. The two participants who indicated isiXhosa as their language of preference said that they were comfortable conducting the FGDs in English (this may be due to the inclusion criteria of the baseline survey, which only included participants who could read and understand English. Due to the small number, these two participants were included in an English FGDs. Two standardised and trained facilitators (one of whom was the first

author of this manuscript) and a trained focus-group observer who made notes regarding participant interaction and nonverbal cues conducted the FGDs. Both the facilitators and the focus-group observer were female, registered dietitians, proficient in both English and Afrikaans and trained in qualitative research methods. At the time of data collection, one facilitator (first author of this manuscript) worked in higher education as a lecturer/researcher and the other facilitator and focus-group observer worked in the private sector.

The facilitators contacted (telephonically or via e-mail) the participants one week before the planned FGD. Participants were contacted until a minimum of ten participants agreed to take part in an FGD. All FGDs were conducted at public libraries located in each of the respective health districts. The libraries chosen were private, comfortable, safe, and free from disturbances, and conveniently located for the participants.

The day before each FGD, the facilitator sent a text message or email to all participants to remind them of the FGD. Refreshments were served upon arrival of participants. Prior to starting the group discussion, the facilitator opened the discussion by welcoming the group and giving each participant an opportunity to introduce him or herself. The facilitator provided an overview of the topic, outlining the ground rules of the discussion and explaining the role of the observer and the recorder. The facilitator explained to the participants that the research was part of a PhD research study on food and nutrition labelling and that the facilitator and focus-group observer were employed (either part-time of full-time) by Stellenbosch University. Participants were not informed that the facilitator and observer were registered dietitians, as it was felt that this might influence participant responses as they might think that they should provide answers a dietitian would want to hear.

Written, informed consent was obtained from all participants as well as consent to record the discussion. A copy of the consent form was given to the participant. The issue of confidentiality was discussed with all focus-group participants at the start of an FGD. Participants were asked to keep information discussed during the focus group confidential.

Participants completed a short one-page demographic questionnaire and then the discussion commenced. No language barriers were experienced during any of the FGDs.

The facilitator used discussion guides developed for NIRs and NINRs respectively, containing open-ended questions and discussion probes to help keep the discussion focused and to

gather data appropriate to the aims and objectives of the study. Examples of questions from each discussion guide are shown in Box 1.

Box 1: Examples of questions included in focus-group discussion guides for nutrition information readers (NIRs) and nutrition information non-readers (NINRs)

<table>
<tr><th colspan="2">Examples of questions included in FGD guides for NIRs and NINRs:</th></tr>
<tr><td colspan="2">Introductory question: Please tell me a little bit more about how and when you generally shop for food?

I would like you to think about when you go to do your grocery shopping. Please explain to me what factors, in general, determine what products you buy?

Now I would like you to think about the food product itself. Can you tell me whether there is anything about the food product, indicated on the label specifically, that will make you buy that specific product?

If we think about the different nutrition information provided on a food label such as the nutrition information table, list of ingredients, health or nutrient claims and logos – would you like any of this information to be presented in another way? Let's talk about what changes can be made to the format in which this information is provided.</td></tr>
<tr><th>Examples of questions in FGD guide for NIRs:</th><th>Examples of questions in FGD guide for NINRs:</th></tr>
<tr><td>I would like to hear more about why the nutrition information on food labels is important to you?

Can you give me examples of the type of nutrition information you read on food labels?

Can you provide me with examples of how you use this information and whether it influences your decision on whether to buy the product or not?</td><td>You have all indicated that you do not read nutrition information provided on the food label often. I would like us to talk more about why you do not read this information.</td></tr>
</table>

At the end of the discussion, participants were thanked for their participation and received a R150 (approximately US$11.70) food voucher to compensate them for their time and travel expenses. All FGDs took between 60 and 90 minutes.

A pilot FGD was conducted two weeks before discussions commenced. The aim of the pilot FGD was for the facilitators and focus-group observer to familiarise themselves with the process followed and their respective roles, and to assess the flow and content of the FGD guide. Ten participants were recruited for the pilot FGD from one of the four groups (NINRs

Grade 7–11). The first author of this manuscript facilitated the FGD, while the second facilitator and focus-group observer attended. The exact same procedure to conduct the FGD, as described previously, was followed.

No changes were made to the FGD guide following the pilot study, therefore data collected during this FGD was included for analysis.

Data analysis

All personal identifiers were removed from the audio recordings before the transcription of the discussions and participant details were kept separate from the audio recordings at all times. The audio recordings of the FGDs were transcribed verbatim by an independent company specialising in transcription services. After the FGDs were transcribed, the researcher (first author of this manuscript) performed quality control on the data to ensure that information was captured accurately. The transcriptions were then entered into a text-analysing computer program (Atlas TI version 7). The researcher went through the transcripts systematically while applying a process of open coding to the text. The researcher made notes of the main themes that could be established around the key concepts explored in the FGDs and added additional themes that emerged while repeatedly reading the transcriptions. The analysis can therefore be described as deductive (pre-prepared structure), but also allowed for inductive analysis (build and develop with an open mind).

To ensure that all emerging themes were identified and to check for inconsistencies, the text was reread several times. The researcher took extra care to remain true to the data and reflect the participants' words or phrasing.

Throughout the data collection and analysis period, the researcher remained cognisant of the concept of data saturation. After conducting nine FGDs and analysing the data collected, the researcher was satisfied that data saturation had been reached, as no new information emerged during the last two FGDs.

Data from the short demographic survey was captured using Microsoft Excel 2013 and summary statistics were used to describe the variables.

RESULTS AND DISCUSSION

A total of nine FGDs, including the pilot FGD, were conducted (Table 1) between 9 am and 12 noon as this suited the majority of participants and on weekdays and weekends to accommodate working participants.

Table 1: Summary of focus-group discussions conducted throughout the City of Cape Town

Health District	Group	Language	Day of the week	Number of participants
Northern	NINR Grade 7–11 (Pilot)	Afrikaans	Friday	8
Northern	NIR Grade 7–11	Afrikaans	Friday	9
Northern	NIR Grade ≥12	English	Saturday	8
Eastern	NIR Grade 7–11	Afrikaans	Friday	9
Eastern	NINR Grade 7–11	Afrikaans	Saturday	5
Southern	NINR Grade 7–11	English	Tuesday	6
Southern	NINR Grade ≥12	English	Saturday	7
Western	NINR Grade ≥12	English	Wednesday	9
Western	NIR Grade ≥12	English	Saturday	6

Background information of participants

Of the 960 participants who completed the baseline survey, 378 participants indicated that they were interested to take part in further FGDs and provided their contact details to the interviewers. Two hundred and twenty seven participants were contacted to enquire whether they would like to take part in the discussions. Of those, 95 were either wrong numbers, did not answer the telephone or did not respond to repeated messages left by the facilitator. Fourty two participants declined to participate as they were busy, while 90 participants indicated that they would attend a FGD. Sixty-seven participants arrived for the FGDs on the day and consented to participate (32 NIRs and 35 NINRs), while sixty-three did not show up on the day of the FGD although they received text message or email from the facilitator the previous day. The mean age of participants was 42.76 ±15.42 (range: 18–72) years while the majority (79.1%) were female. More than half (56.7%) were of mixed-race ancestry (coloured), 20.9% were white, 16.4% were black and 6.0% were Asian. Approximately a third of participants were married (32.8%), while 35.8% were single, 14.9% were in a relationship and the remaining 16.5% were either engaged, divorced or widows/widowers. The majority of participants (71.6%) had children, with the mean number of children per participant being

1.95 ± 1.94. Forty-three percent (43.3%) of participants indicated that their home language was Afrikaans, 32.8% said English while 14.9% indicated isiXhosa. The remaining 9% indicated isiZulu, French, Portuguese, Chinese or Korean. Seven out of 10 participants (70.58%) reported having a net household income, after deductions, of less than R6400 (approximately US$499.20) per month.

Results from the FGDs are discussed according to four themes. The first theme relates to the first objective of the research; the second and third themes relate to the second objective; while the last theme relates to the final objective of the study.

Theme 1: Self-reported factors influencing purchasing of a food product

Economic-, brand- and marketing-related factors

Irrespective of the socio-economic status of participants, the price of food products was considered very important and had a major influence on food-purchasing decisions. These findings are in line with a survey conducted on the same population where more than 80% of participants indicated that price and special offers always influenced their purchasing of food products (Koen *et al*., 2017, submitted for publication). For lower-income participants, price and products on sale or promotion were sometimes the only determining factors when making food choices:

> *Price is important, very important ... I only shop according to the price* and *I do my shopping once a week. It is better for me because the specials come out weekly ... and I only shop for the specials*. [Grade 7-11 NINR]

In the current economic climate, placing an emphasis on price and specials is understandable, although it is unfortunate that some participants perceived healthier food choices to be more expensive. These findings are similar to those in international research, where the price of foods was also mentioned as a major perceived barrier to eating a healthy diet (Kearney and McElhone, 1999; Steenhuis *et al*., 2011).

Higher-income participants indicated that brand name and products that they were familiar with sometimes outweighed the importance of price as they associated certain brands with better quality and taste and therefore as providing more value for money.

> *I would rather buy a good quality brand that I have always relied on that I can trust. And I am not going to buy a no-name brand just because it is cheaper because "goedkoop koop is duurkoop"* [buying cheaper is more expensive in the long run] *in my mind.* [Grade ≥12 NIR]

These findings concur with previous research, indicating that higher-income consumers, who are mostly also more educated than consumers from lower-income groups (Lamb *et al*., 2010), are more likely to choose specific brands as they consider these brands to be more reliable (Sanlier and Karakus, 2010).

Buying specific brand names was also associated with wealth and class, as some purchased brands to impress guests, while generic brands were purchased for use in the household. Wyma *et al*. had similar findings when investigating the variables influencing food perception (Wyma *et al*., 2012).

In SA, many food retailers have a reward system which rewards customers when they spend a certain amount of money at the store or buy specific products (this reward can either be in the form of a cash discount or a small gift). Participants said that this reward system sometimes influenced their product choices, as they would buy either an 'inferior' brand, a more expensive product or an unhealthier option to earn the extra points.

Marketing of food products played an important role for parents with children in the household as they indicated that their children influenced the products they bought depending on the characters presented on the packaging or the commercials seen on television.

> *The TV is very powerful; what they see on the TV, they want that. They have never tasted Nutella, but they tell me I must buy it. They will continue to bug me until I buy it, and once they have tasted it then they are happy, until they see the next thing.* [Grade 7-11 NIR]

Some parents even avoid taking their children when doing grocery shopping as they feel they buy more unnecessary and expensive items. In 2014, draft regulations were published to address the advertising of foodstuffs and non-alcoholic beverages to children in SA. According to the guidelines (which have not come into effect to date), unhealthy foods may not be marketed to schoolchildren from Grade 0–12, while child actors aged ≤ 18 years, using celebrities or sport stars, cartoon characters, puppets, or any form of computer animation,

and the use of competitions, gifts or collectable items, may also not be used to market unhealthy foods to children (Department of Health, 2014).

Family and cultural influences

From the discussions it emerged that the size of the household and the preferences and health of family members influenced the purchasing decisions of participants. Some participants from larger households with a lower income bought cheaper products in bulk. They said that the preferences of the majority in the household were catered for:

> *I buy what is cheap and can feed many mouths – I do not care if someone is on a diet.* [Grade 7-11 NINR]

Others felt that the dietary requirements of their children or family members influenced their product choices:

> *My husband is a diabetic and eats only low-fat yoghurt. So now I eat it too. It is just easier for me to buy the same for everyone*. [Grade 7-11 NIR]

It seems as if those living alone were more inclined to buy convenience or ready-made meals and products that catered for their specific preferences for various reasons. Reasons included the perceived high cost of ready-made meals for a large family and being able to *eat what I like because I live alone*.

Cultural influences necessitate attention to food labels, as food customs involve inherent, strong beliefs, norms and values that directly influence food choices in a society (Mullins *et al*., 2005). It is therefore not surprising that culture and religion emerged during the FGDs as further factors influencing food choice. The 'halaal' logo was mentioned by Muslim participants as a non-negotiable requirement on certain products. There was, however, the perception that halaal products are sometimes more expensive.

Convenience

Participant discussions about ready-made meals or convenience foods were mixed and evoked different emotions. Those who preferred ready-made or convenience meals cited a lack of time to prepare a proper meal from scratch or not wanting to make the effort to only cook for one or two people as the main reasons for buying them. These findings are similar to those of Mallinson *et al*., who established that some of the main reasons for reliance on

convenience foods were to save time and labour. It was also found that the fragmentation of mealtimes encourages purchasing of convenience food (Mallinson *et al*., 2016); however this did not emerge during the FGDs.

Even though convenience foods were perceived to be more expensive, many felt that they were worth the extra expense for the time saved preparing a meal:

> *My brother calls me the microwave queen; if it does not go in the microwave it does not get bought. Especially when I work late or if I am not really feeling like cooking, I will go and I will get a meal from x. Yes, it is more expensive, but I live alone so I can afford it.* [Grade ≥12 NIR]

Take-away meals were considered a treat by some and something bought for *special occasions* or *to treat the children*. Some participants were concerned about the quality and taste of convenience meals and believed that they were unhealthy for them and their families:

> *I do not make any packet things; I do not buy any ready x or nothing like that; it tastes horrible and it is just so artificial and disgusting.* [Grade ≥12 NIR]

Product display and packaging

Product display was mentioned in the discussions as a factor that can influence what food products participants buy:

> *What makes a difference to me is how the stores display the products. I buy the things I can easily find on the shelf. I don't have time to look. The products at the ends of the shelves and those as you walk into the store ... those are the ones I buy*. [Grade ≥12 NINR]

Participant discussions about food packaging were mainly focused on the attractiveness and size of the packaging. Bright colours, clear wording and pictures attracted consumers to certain food products.

> *I find myself buying things that I have never bought because of the packaging, because I think, wow, this looks cute, or the picture looks yummy*. [Grade 7-11 NIR]

Some associated attractive packaging with a better quality and more expensive product, while white, plain packaging was associated with an inferior quality product. Plain packaging was, however, sometimes preferred as it was perceived to be better value for money, irrespective of taste and quality. These findings are similar to research conducted by Venter *et al*. (2011),

who found that attractive packaging influenced consumers' perceptions of a food product and simplified packaging was perceived to contain cheaper products of possibly inferior quality.

Depending on the shopping habits of participants, package size played an important role in product choice. Those who did their grocery shopping less frequently were more inclined to buy food products in bulk, especially products with a longer shelf life such as flour, sugar, maize, cereal. Fresh produce such as yoghurt, milk, bread, and cheese were often bought in smaller quantities on a daily or weekly basis. From a practical point of view, some participants were very specific about the preferred physical size of the food purchased, depending on the storage space they had available at home. For those with no refrigeration or freezing facilities at home, shelf-stable products such as ultra-high temperature (UHT) milk was preferred to milk that required refrigeration.

Packaging material was another factor influencing product choice. Glass containers were specifically highlighted for repurposing for home use, in making jam for example. This functional attribute of packaging was also reported in other research as it was found that consumers have a positive association with packaging that can be used for other purposes (Venter *et al*., 2011, Scott and Vigar-Ellis, 2014). A less prominent factor influencing product choice was whether packaging material could be recycled. For those specifically concerned with the environment and their carbon footprint, recyclable packaging material was important, but only if the product was not more expensive. Although packaging is a growing environmental concern among consumers (Prendergast and Pitt, 1996; Duizer *et al*., 2009; Venter *et al*., 2011; Stoltz *et al*., 2013), it is of concern that there is no established recycling culture in SA, with only a small percentage of consumers recycling packaging regularly (Scott and Vigar-Ellis, 2014).

Country of origin and expiry dates

Participants were more concerned with trusted brands such as Bokomo (a South African brand since 1930) and Cadbury, than with a product's country of origin. There was however the perception that certain products such as sweets from other countries were of inferior quality and contained *dangerous ingredients*, although they were much cheaper. Participants were especially wary of food labels in foreign languages. For those on a strict budget, price

remained the determining factor as participants indicated that they would buy the product, irrespective of their concerns about quality and safety. There were however exceptions, such as chocolate and olive oil, with participants indicating that they would specifically buy chocolate from European countries and olive oil from Portugal, Spain or Italy as they associated these products with better quality and taste.

Expiry dates on products were considered extremely important, especially for perishable products such as milk, yoghurt, pre-prepared vegetables, meat, chicken and fish. In a survey conducted on the same population, approximately 90% of participants indicated that they always considered the expiry date when purchasing a product (Koen *et al*., submitted for publication), while other research conducted in SA had similar findings (Van der Merwe *et al*., 2014). In the discussions, participants indicated the expiry date would sometimes influence the brand purchased, but said it also depended on when they were planning to use the product:

> *Sometimes it is on special because it expires tomorrow, but I will buy it if I know we are going to eat it today.* [Grade ≥12 NIR]

An alarming trend that emerged from the discussions was that of participants ignoring expiry dates and specifically buying expired products (from informal shops), even though they were aware of the risks, because such products were less expensive:

> *You know, there is this place I know about, where you can buy expired stuff. It is so much cheaper ... and I mean I am still alive*. [Grade 7-11 NINR]

Organic and genetically modified products

From the discussions, it seems as though many participants did not purchase organic produce owing to their perceived high cost and limited availability. These two deterrents to buying organic produce (amongst others) have also been reported in other research, with the high price of organic food being the main obstacle to its purchase (Hughner *et al*., 2007). When the topic of genetically modified food arose, many did not know what genetically modified foods were, although in general, the reaction towards the term was negative. None of the participants indicated that this was something they looked for on a food label.

Nutrition information on food labels

Participants indicated that although they found the nutrition information on food products interesting, it did not always influence their purchasing behaviour. These findings reflect the findings of the survey conducted on the same population, where approximately two-thirds of participants indicated that they read the nutrition information provided on food labels, but only half said that it influenced their purchase of a food product (Koen *et al*., submitted for publication). For many, price and taste of the product was still more important:

> *I know low-fat milk is healthier and better for me so I buy it sometimes, but if the full-cream milk is cheaper, I would buy it. I prefer the taste anyway.* [Grade ≥12 NINR]

When buying a product for the first time, participants were more inclined to spend time reading the nutrition information provided on the label compared to habitual purchases or buying known brands. This has also been documented by other researchers when investigating whether nutrition information influences product choice (Peters-Texeira and Badrie, 2005; Van der Merwe *et al*., 2013).

From the discussions it emerged that the list of ingredients, nutrient content claims, and specific health-endorsement logos (HELs) were considered important to those reading nutrition information on food labels. For some, the presence of a particular HEL was their only requirement when assessing the health properties of a product:

> *I just look for the heart* [South African Heart and Stroke Foundation logo] *and nothing else ... then I know it is a healthy product*. [Grade 7-11 NIR]

This is not surprising, as several studies have shown that consumers have a preference for labels containing graphics, symbols and HELs as this simplifies the nutrition information (Wills *et al*., 2009; Hawley *et al*., 2013). South African consumers are also familiar with this particular logo, as it was launched in SA three decades ago.

Others, however, were incorrectly under the impression that the presence of a HEL indicated that they could eat large quantities of the product:

> *I am a diabetic you see, so the doctor told me to look for the heart mark ... so now I know if I buy the one with the heart mark on it, I can eat as much of it as I want.* [Grade 7-11 NIR]

This shows that HELs should be accompanied by proper education of consumers to ensure they understand the meaning of these logos.

Although some participants indicated that they read the information provided on the nutrition information table, many felt they struggled to interpret the information and that it therefore did not influence their purchase of a product as much as a logo or claim present on the front-of-packaging. Of those reading the information in the table, total energy, saturated fat, carbohydrates, and sugar were most important to participants, which is in line with international research (Campos *et al*., 2011), as well as with a survey conducted on the same population (Koen *et al*., submitted for publication), with the exception of protein, which was not mentioned during the discussions. It was of concern that often participants could not explain how they utilised the information (such as total energy) to determine the suitability of a product. Some participants expressed their frustration with not having a better understanding of nutrition information provided on food labels:

> *Although I am interested* [in the nutritional value of products]*, I do not understand the table. It confuses me. If I understood it better, then I would know* [the food is] *unhealthy and I won't buy it.* [Grade ≥12 NIR]

Theme 2: Reasons why consumers read the nutrition information on food labels

When discussing the nutrition information provided on food labels, participants who read the information (nutrition information table, health and nutrient content claims, list of ingredients and/or HELs) could be classified into three main categories: participant/s with family members with specific health conditions or food allergy/intolerance, those trying to lose weight or maintain their current weight, and those wanting to maintain their health and prevent disease.

Of those suffering from a health condition (or purchasing food products for a family member suffering from a health condition), heart disease, diabetes and hypertension were the most common health conditions mentioned. This is not surprising, as South Africans over consume dietary fat, sugar and have a low micronutrient intake, thus being at greater risk of non-communicable diseases (Vorster *et al*., 2014; Mchiza *et al*., 2015). As expected, participants suffering from heart disease were most concerned about the fat and cholesterol content of food, mentioning saturated fat in particular. This is justified, as the South African Heart and

Stroke Foundation recommends limiting foods high in saturated fat, including fast foods, fatty meat and processed meat (Heart and Stroke Foundation South Africa, 2017). Diabetes sufferers were concerned about the sugar and fat content and to a lesser extent the glycaemic index of food, while those suffering from hypertension were mostly concerned about the salt content of food products. In SA, new legislation (Department of Health, 2013b) to reduce the sodium content of foods came into effect in 2016, forcing manufacturers to lower the sodium content of certain foods over a three-year implementation period as a measure to address the high salt intake of South Africans and the increasing number of South Africans suffering from hypertension, heart disease and stroke (Western Cape Government, 2016). Furthermore, in 2013, the Heart and Stroke Foundation South Africa established Salt Watch, consisting of a multi-sectoral coalition group, to create national consumer awareness and to encourage South Africans to reduce their salt intake (Heart and Stroke Foundation South Africa, 2017). For participants trying to lose weight, energy and fat content of foods was important.

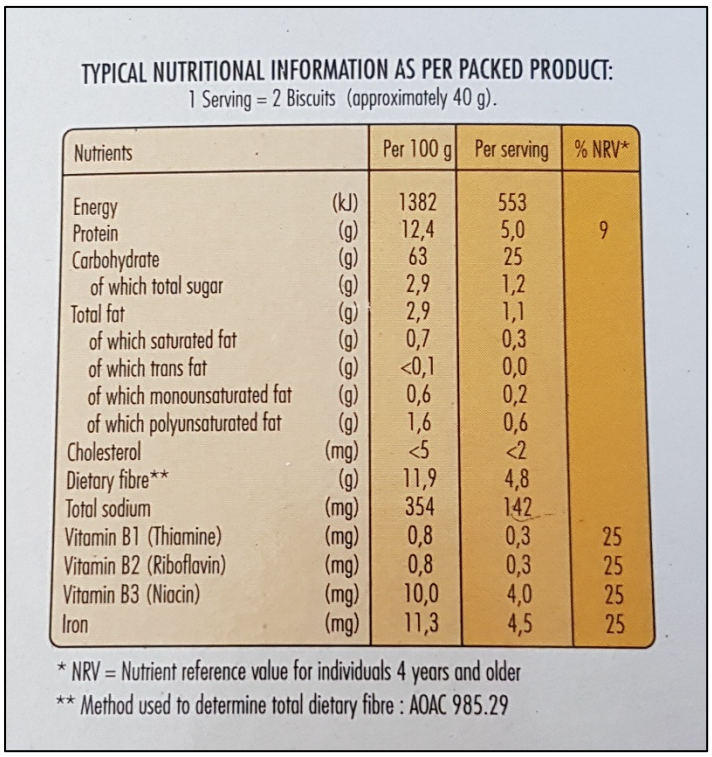
Very few participants mentioned vitamin and mineral content of foods as important to them, although it was specifically mentioned when buying products such as breakfast cereals for children:

> *When I buy cereal for the kids, I buy those with the extra vitamins and minerals. It is all they want to eat ... and at least it contains something good.* [Grade 7-11 NIR]

Vitamin C and iron were the only two micro-nutrients specifically mentioned during the discussion.

When discussing the nutrition information table specifically, participants struggled to explain how they interpreted the information provided in the table, with many not being able to explain how they would consider a product to be suitable in terms of energy, fat, sugar or sodium values. It seems as though participants used these values mostly to compare nutrients in different foods to determine which product to buy, which confirms the results from a survey conducted on the same population (Koen *et al*., submitted for publication). Throughout the discussions, Recommended Daily Allowance (RDA) or Nutrient Reference Values (NRVs) included in the table were not mentioned by any of the participants as

important when assessing the nutritional value of a food product. An example of a typical nutrition information table used on South African food products is shown in Figure 1.



TYPICAL NUTRITIONAL INFORMATION AS PER PACKED PRODUCT:
1 Serving = 2 Biscuits (approximately 40 g).

Nutrients		Per 100 g	Per serving	% NRV*
Energy	(kJ)	1382	553	
Protein	(g)	12,4	5,0	9
Carbohydrate	(g)	63	25	
of which total sugar	(g)	2,9	1,2	
Total fat	(g)	2,9	1,1	
of which saturated fat	(g)	0,7	0,3	
of which trans fat	(g)	<0,1	0,0	
of which monounsaturated fat	(g)	0,6	0,2	
of which polyunsaturated fat	(g)	1,6	0,6	
Cholesterol	(mg)	<5	<2	
Dietary fibre**	(g)	11,9	4,8	
Total sodium	(mg)	354	142	
Vitamin B1 (Thiamine)	(mg)	0,8	0,3	25
Vitamin B2 (Riboflavin)	(mg)	0,8	0,3	25
Vitamin B3 (Niacin)	(mg)	10,0	4,0	25
Iron	(mg)	11,3	4,5	25

* NRV = Nutrient reference value for individuals 4 years and older
** Method used to determine total dietary fibre : AOAC 985.29

Figure 1: Example of a nutrition information table

Participants said that they mainly looked for information related to the nutrient content or health properties of a product by studying information on the front-of-pack, while only a few read the information provided in the nutrition information table. These findings concur with those of other research, which suggests that placing nutrition information on the front-of-packages is more effective than information positioned on the side or back of packages (Wansink, 2003; Grunert and Wills, 2007). Fat, sugar, sodium, energy, and Banting (low carbohydrate) claims were mentioned often.

It is important to note that in SA currently, the nutrition information table is only mandatory if a nutrient content claim is made on the product, while the vitamin and mineral content of food may only be included in the nutrition information table if it is present in amounts above 5% of the NRVs, while a vitamin or mineral claim may only be made if it is present in amounts above 15% (Department of Health, 2010).

From the discussions it emerged that participants read the list of ingredients for various reasons. For many participants, the amount and order of ingredients gave an indication of the quality and health properties of the product:

> *I only buy 100% fruit juice. I look at the ingredient list to make sure there are no added sugar or preservatives in the juice ... if sugar is the first ingredient on the list, then I will avoid the product.* [Grade ≥12 NIR]

These findings confirm the results from another South African study (Kempen *et al*., 2011).

Another reason for reading the ingredient list was to avoid specific ingredients or additives. Some participants checked the list of ingredients for allergens as someone in the household suffered from food allergies or intolerances. Some avoided additives such as monosodium glutamate and tartrazine for the same reason or because of the belief that additives in general were unhealthy and should be avoided. This could be due to the wide media coverage these additives have received over the past years and their possible link to attention-deficit hyperactivity disorder (Stevens *et al*., 2011). Some participants, however, particularly those from the lower-income groups, indicated that they would still buy sweets and chips containing these additives if they were cheap and on promotion, stating that:

> *I know those things they add isn't good for you, but we don't have a lot of money and at least my child can get a packet of chips for 50 cents* [approximately US$0.04]. [Grade 7-11 NIR]

The presence of the Heart and Stroke Foundation South Africa Heart Mark was considered by many participants, especially those suffering from heart disease and diabetes, as an important indicator of the healthy properties of a food. The Weigh-Less logo was important to those participants wanting to lose weight, although there was a perception that foods containing this logo were very expensive. Only a few mentioned that the Glycaemic Index Foundation South Africa logos were important to them, with many participants not knowing what glycaemic index (GI) or GI values referred to. This is in contrast to research conducted by Kempen *et al*. (2011) in SA, who found that consumers were particularly interested in the GI value indicated on food labels. The Cancer Association South Africa Smart Choice Seal caused much confusion among participants, with some thinking incorrectly that products containing this logo were specifically for people with cancer:

> *I don't buy products with the CANSA logo because I don't have cancer*. [Grade 7-11 NIR]

No other approved South African HELs were mentioned during the discussion.

Theme 3: Reasons why consumers ignore the nutrition information on food labels

During the discussions with participants, it was clear that reasons for ignoring the nutrition information on food labels were diverse. Participants said that lack of time was a major contributing factor to why they did not read the nutrition information on food labels. Work, busy schedules and children were all given as reasons why they did not take the time to read the nutrition information, saying that they spent as little time as possible doing their grocery shopping:

> *I work all day, then I have to rush home to pick up the children and cook dinner. When I go to the store, I am in and out in 10 minutes. I do not have time to look at the nutrition information of products*. [Grade ≥12 NINR]

Many consumers said they bought the same products every time they did shopping, while some only bought specific brands – for these consumers, trust in a specific brand was the main factor when purchasing a food product, irrespective of its nutritional value. For others, the price of the product was the most important factor considered. Some felt that although they were interested in the health properties of food products, they would always buy the cheapest option (owing to their strict food budget) and therefore did not waste time reading the nutrition information.

A few participants said that the nutrition information simply did not interest them – for them, taste and quality were more important. These participants felt that they were relatively healthy and could eat anything they liked, if they ate different types of food in moderation:

> *I never look at the fat, sugar and all those things. I buy what I like ... if I start to pick up weight, I exercise and eat less.* [Grade 7-11 NINR]

Another issue that emerged during the discussions was a lack of trust in the information provided on food labels. Some participants felt that the nutrition information provided on food labels was misleading and that manufacturers were trying to deceive consumers. These participants said they did not read the nutrition information, because *it is all nonsense anyway*.

A lack of understanding, especially of the nutrition information table and list of ingredients, was another reason why participants chose to ignore the nutrition information on labels. Many said that they did not know how to interpret the information provided in the table and how to make healthier food choices based on the information provided on the food label:

> *I didn't learn that stuff in school. I don't know what all those numbers are for ... so I just ignore it.* [Grade ≥12 NINR]

Some said the presence of two columns (nutritional information per 100g and per serving) were sometimes confusing. These findings are similar to those of a systematic review conducted by Campos *et al*. (2011), who found that consumers struggle with the quantitative information presented on labels. Research conducted by Jacobs *et al*. in Potchefstroom, SA, however, found that the majority of consumers had no difficulty understanding the nutrition information, including the information provided in the table, although this might be due to the higher education level of the participants from this particular study (Jacobs *et al*., 2011). When discussing the list of ingredients, participants felt that the terminology was sometimes too complex and that simple ingredient names should rather be used.

Overall, participants also felt that too much nutrition information was sometimes displayed on food labels and this could become overwhelming and intimidating for some. When too much information was provided, some said they would simply disregard all of it. This was specifically true for the presence of various HELs on one food product. Many felt that one HEL should be used on all food products to indicate their health properties:

> *It would be so much easier for me if there was one standard logo that tells me this is healthy or not ... then I can only look for that.* [Grade 7-11 NINR]

These reasons for ignoring nutrition information on food labels are very similar to those reported in a review conducted by Mandle *et al*. (2015) on nutrition labelling in the global South, confirming that consumers, irrespective of their demographic or geographic background, cite similar reasons for not reading the nutrition information on food labels.

Theme 4: Consumer expectations regarding the nutrition information provided on food products and food labelling in general

For many participants, too much information is displayed on food labels, and therefore the actual font size of label information is problematic. Many participants, especially older

participants and those wearing glasses, indicated that they simply could not read the information. This includes general information pertaining to storage and cooking instructions, expiry dates, and nutrition information such as the list of ingredients and the nutrition information table. However, even when font size was acceptable, participants preferred simpler labels with less information. This is a common barrier to consumers and has been reported nationally (Jacobs *et al*., 2011; Van der Merwe *et al.*, 2014) and internationally (Campos *et al*., 2011).

In general, most participants said labels should be attractive, colourful and preferably include pictures of the actual product and preparation instructions where possible. Many felt that this attracted their attention and influenced their purchasing behaviour.

Participants were frustrated with known brands changing their label formats and layout, stating they would prefer them to remain the same as this made food shopping easier as they were familiar with the label:

> *I hate it when they change the labels of the products that I like … it makes it difficult to find* [them] *on the shelf and to locate information on the label*. [Grade ≥12 NINR]

Discussions about expectations regarding how nutrition information should be displayed on labels were focused on emphasising the most important information on the front-of-pack. Most participants preferred products that contained nutrient content claims, health claims, and HELs on the front-of-pack. Some also said they preferred a summary of the nutrients (similar to the traffic light label) on the front-of-pack so that they did not have to consult the nutrition information table:

> *I like the labels with the green, red and orange dots on the front, showing you if there is too much fat or sugar in a product.* [Grade ≥12 NIR]

To avoid further confusion, many participants expressed the need for more standardised front-of-package labelling, saying that it would be much easier locating information such as the expiry date, total mass or weight, and serving size if standardised. Symbols such as the Halaal and Kosher symbols were also specifically mentioned. Participants indicated that the following nutrition information should be included and standardised on the front-of-pack: nutrient and content claims, allergens, and HELs. Participants once again expressed the need for a single HEL to be used on all healthy food items, to avoid confusion.

The best front-of-pack labelling approach is, however, being debated. The evidence suggests that various labelling schemes and different presentations on food products may cause confusion for consumers (Food Standards Agency, 2009). In high-income countries, the traffic light has been found to be the most effective labelling scheme (Cecchini and Warin, 2016), although well-recognised HELs have also been found to be particularly effective (Campos *et al*., 2011).

Another concern identified by participants was the language used on food labels in SA. As SA has 11 official languages, it was felt by some participants that food labels should contain more than one South African language, although participants also said that this might cause further information overload on labels and that it would be difficult deciding which one of the other 10 (other than English) official languages to include. The need for more than one language on South African food products has also been reported in a study conducted elsewhere in SA. (Jacobs *et al*., 2011).

CONCLUSION

This study aimed to explore the factors that influence food purchases of participants and to explore why they read or ignore the nutrition information on food labels. Furthermore, it aimed to investigate the expectations of consumers regarding nutrition information and food labelling in general.

Findings suggest that various internal and external factors influence the purchasing behaviour of participants and that the socio-economic status of participants plays an important role in how they make purchasing decisions. The price of food items was sometimes the only consideration when selecting food products, irrespective of their perceived quality and nutritional value. This poses a dilemma, as consumers need to be educated on the advantages of selecting healthier food products on a very limited budget.

Other factors, including taste, brand loyalty, marketing, and convenience were also major influencers for some, while family, culture, and religion emerged as important external factors when making purchasing decisions. With regard to the nutrition information on food labels, the list of ingredients, nutrient content claims and specific HELs were considered important.

Participants read the nutrition information on food labels for different reasons. These reasons can broadly be grouped together as follows: to assess the nutritional value of a product, to

assess the health properties of the product, to avoid certain ingredients and allergens, and to determine product quality.

Findings suggest that participants struggled to understand the information provided on food labels, specifically the nutrition information table, and that this lack of understanding may result in their ignoring the information entirely. More should be done to educate consumers on how to utilise this information correctly, in order for them to make healthier food choices. A lack of time or interest, price concerns, and trust in food labelling information also emerged as reasons why consumers ignore nutrition information on food labels.

This study shows that there is a need for simpler food labelling, with more graphics and symbols and less complex terminology, information overload, and quantitative information. A standardised front-of-package labelling scheme could be a possible solution, as well as a single HEL for SA for use on healthy food products. These expectations also give food manufacturers and government a good idea of what consumers are looking for when making food purchases.

These findings give a comprehensive overview of the purchasing behaviour and motivations for reading or ignoring nutrition information on food labels of participants from the City of Cape Town, SA. It supports the results of a survey conducted on the same population (Koen et al., submitted for publication), and correlates with other research conducted throughout SA. Since the present study was qualitative and exploratory in nature, the findings cannot be generalized to the Western Cape or larger South African consumer population and are only representative of the participants included in this study. This study did not include illiterate consumers due to the majority of consumers in Cape Town being literate (>90%). It is therefore also recommended that similar research be conducted on illiterate consumers and those living in rural areas from other provinces in South Africa.

Findings from this study, together with the findings from a survey conducted on the same population (Koen *et al*., 2017, submitted for publication) and other studies conducted in SA, can be utilised to adapt current food and nutrition labelling strategies and education campaigns in SA according to the needs and expectations of the consumer. By creating food labels with nutrition information consumers can use and understand, and through proper

education, they will be better equipped to make healthier food choices; this in turn can contribute to fighting the battle against NCDs.

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Chapter 6

Research article: The development of a single health-endorsement logo for South Africa

THE DEVELOPMENT OF A SINGLE HEALTH-ENDORSEMENT LOGO FOR SOUTH AFRICA

Manuscript submitted to: *Public Health Nutrition*

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We confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

Authorship:

The principal researcher, NK, developed the idea and the protocol for this research study, planned the research, undertook data collection (with the assistance of trained research assistants), captured the data for analyses, analysed the data with the assistance of a statistician, interpreted the data and drafted the article. Fellow researchers, RB and EWV, provided input at all stages and revised the protocol and article.

Ethical Standards and Disclosure:

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and all procedures involving human subjects were approved by the Health Research Ethics Committee of Stellenbosch University, Cape Town, South Africa (S15/08/164). Written informed consent was obtained from all subjects. Permission to conduct the study was also obtained from the head offices of the four main retailers and managers of individual grocery stores.

ABSTRACT

Objective: To develop health-endorsement logos (HELs) for food products indicating healthy choices based on the South African nutrient profile model and to pilot test these logos on consumers.

Design: Multi-stage mixed method design.

Setting: Cape Town (CT), South Africa (SA).

Subjects: Nine focus-group discussions (FGDs) were conducted with adult consumers to explore what types of HELs are preferred and why. Based on the findings, 10 HELs were designed by a graphic design team. A modified Delphi technique, conducted with experts in the fields of nutrition and food science was employed to eliminate lowest scoring HELs and to improve the design of the remaining logos. Participants from the initial FGDs participated in pilot testing of the improved logos.

Results: Participants from FGDs (*n* 67) were positive about a single HEL, stating it would make food labelling less confusing as they didn't understand the various HELs used. Participants indicated the logo should include wording related to 'healthy choice' or 'better choice' and pictures/symbols related directly to health and/or food. During two rounds of scoring and comments by experts (*n* 19), five logos were eliminated and the design of the remaining five improved. Three of five remaining logos received overall rankings of 3.08/5, 3.28/5 and 3.39/5 respectively, during FGDs (*n* 36) in the pilot-testing phase.

Conclusion:

HELs were designed and consumer tested. Three designs will be submitted to the national Department of Health to consider for implementation after further testing as a tool to assist in addressing the high incidence of non-communicable diseases in SA.

KEY WORDS

Health-endorsement logo

Food labelling

Consumer

South Africa

Logo design

Nutrient profiling

INTRODUCTION

Nutrition labelling is increasingly considered an important component of comprehensive strategies to tackle unhealthy diets and associated non-communicable diseases (NCDs).[1] Globally, NCDs are the leading cause of death, killing more people each year than all other causes combined.[2] In South Africa (SA), according to the World Health Organization, the probability of dying between ages 30 and 70 years from the four main NCDs is 27%[3] and on the increase.[4] The prevalence of NCD risk factors such as overweight and obesity is unacceptably high, with 68% of women and 31% of men being overweight or obese, while 46% of women and 44% of men are hypertensive.[5]

In response to this increasing NCD rates, the South African government implemented the Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013–2017.[6] To support this national strategy, new interim labelling regulations were published in 2010, coming into effect in 2012.[7] In 2014, amendments to this legislation were published for comments. The new legislation, which to date has not come into effect, includes regulations on various nutrition and health claims based on nutrient profiling.[8]

Nutrient profiling is the "science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health."[9] It has various applications, including nutrient and/or health claims as well as product health-endorsement logos (HELs) or symbols as part of front-of-pack labelling.[10] In SA, the use of a slightly modified version of the Australian and New Zealand nutrient profiling model [Food Standards Australia New Zealand (FSANZ)] (based on the United Kingdom Ofcom model) has been recommended to use as a screening or first test to determine the eligibility of food items to carry a nutrient and/or health claim.[11]

In response to the publication of the new proposed labelling regulations and research showing that consumers prefer simple, less complex nutrition information on food labels[12], an opportunity arose for developing a front-of-pack label using a single health-endorsement logo. This single HEL could be used for food products indicating healthy choices based on the South African nutrient profile model.

Although there is currently little evidence documented on the actual development process of HELs suitable for and acceptable to the consumer, from the available literature it is clear that the process should be systematic, transparent, and involve all relevant role players, including leaders from academia, public health professionals, government, industry, and consumers.[13, 14] The Choices programme from the Netherlands is an example of a scheme that uses HELs implemented in 2006.[15]

In order to determine the need for the development of such a logo, research was conducted on consumers from Cape Town, SA, as phase one of this multi-phase, mixed-methods study. Six out of ten consumers that participated in the interviewer-administered electronic survey on food and nutrition labelling indicated that they would prefer a single HEL to be used on all food products. Consumers struggle to interpret the various approved HELs currently used on food labels in SA, suggesting that a single HEL could be more beneficial.[16]

The objectives of the research were to explore what type of HELs are preferred and why; to make recommendations to an independent logo design company for the design of HELs for products that are healthier choices based on the South African nutrient profile model; to use experts to identify the most suitable logos and to pilot field test these logos to determine their acceptability and comprehension. In addition, the field-tested HELs will be recommended to the Department of Health, Directorates: Nutrition, NCDs, Health Promotion and Food Control, to consider for implementation after further testing in the different provinces of SA.

MATERIAL AND METHODS

The present study was conducted within a multi-stage mixed-methods framework using an exploratory sequential approach. Data was collected in three phases, using quantitative and qualitative research methods. During phase one, quantitative data was collected by means of an interviewer-administered electronic survey to determine the use of HELs and to assess the need for a single HEL to be used in SA. In phase two, qualitative data was collected using focus-group discussions (FGDs) to further explore the need for a single HEL and to determine consumer preferences in terms of logo design and comprehension. In phase three, HELs were developed, followed by an evaluation of the logos by a group of experts. The lowest scoring logos were eliminated during two rounds of scoring, using a modified Delphi technique. The

remaining, highest scoring HELs were then evaluated during FGDs with consumers. Figure 1 provides a graphic illustration of the research process. For the purpose of this paper, data from phase two and three are reported. Permission to conduct the study was obtained from the Health Research Ethics Committee of Stellenbosch University, Cape Town, SA (S15/08/164). Written informed consent was obtained from all consumers who participated in the study.

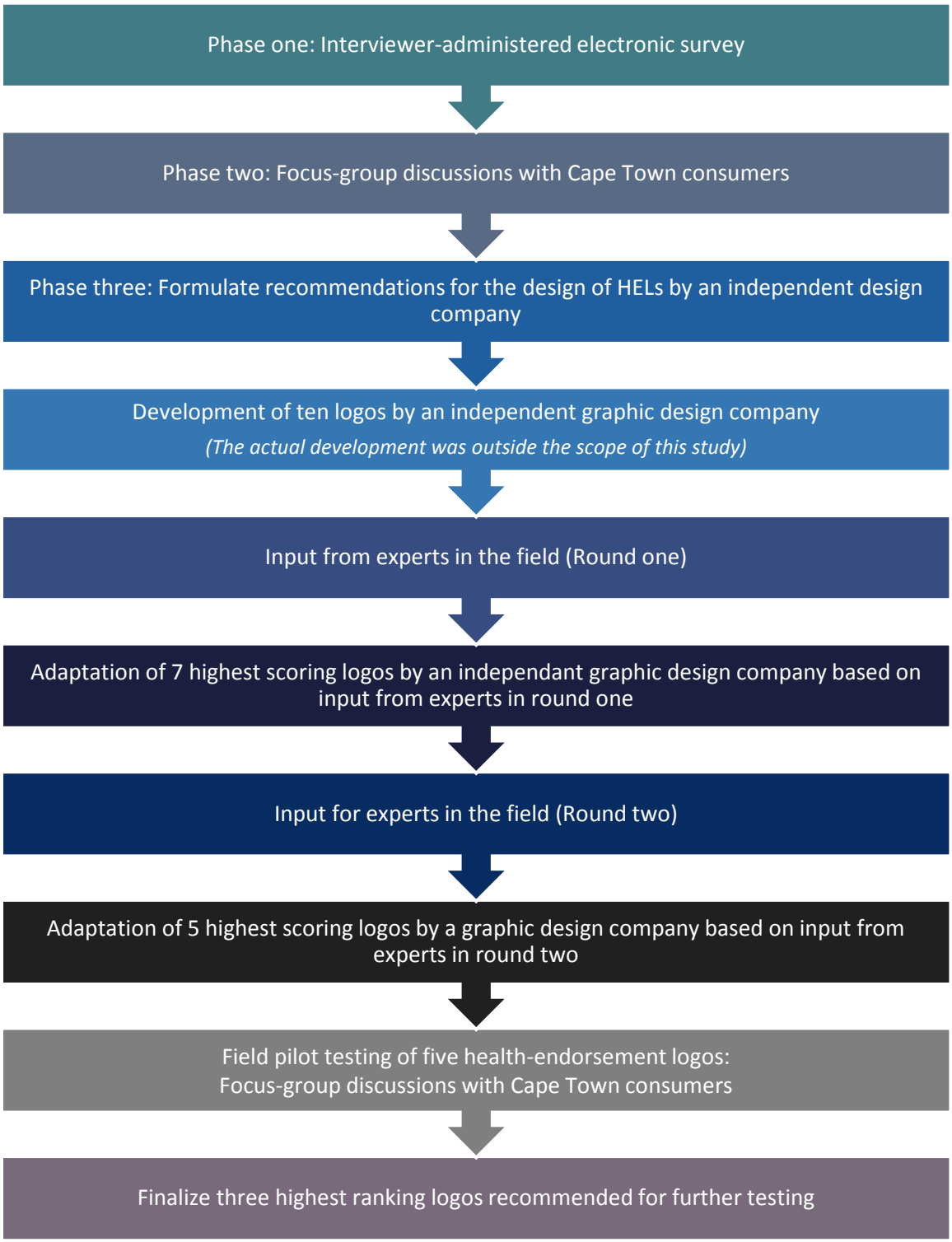


Figure 1: Research process for the development and pilot testing of health-endorsement logos

Sample selection – Interviewer-administered survey (phase one) and FGDs (phases two & three)

Study participants for phases one to three consisted of literate (completed Grade 7), adult consumers (≥18 years) who were their households' primary food purchasers (doing >50% of the food shopping for the household), and who did their grocery shopping at selected grocery stores in Cape Town, Western Cape, SA. Only the primary food purchaser was included to ensure that all participants, on a regular basis, came into contact with food labels and made decisions on what food items to buy for the household.

Sample selection – Experts (phase three)

The group of experts consisted of experts in the field of nutrition, food science, and food labelling from both the private and public sector in SA (including academia, government, and industry) who agreed to participate in the study and who were willing to sign a confidentiality agreement.

Methods of data collection

During phase one, conducted during February and March 2016, 960 participants were recruited to participate in an interviewer-administered survey from 16 grocery stores (from the four main food retailers in SA) located within four of the eight health districts of Cape Town, SA (detailed information on the sampling of the grocery stores and participants for phase one is given elsewhere).[16]

Participants who participated in the interviewer-administered electronic survey during phase one were approached for participation in FGDs during phase two conducted during May and June 2016. Participants were selected by means of purposive sampling according to their education level, language preference, the health district where they were recruited from in phase one, and whether they read the nutrition information provided on food labels. FGDs were conducted in either Afrikaans or English. The option to conduct the FGDs in isiXhosa was available; however all participants indicated English or Afrikaans as their language of preference. This may be due to the inclusion criteria of the baseline survey, which only included participants who could read and understand English. Two standardised and trained facilitators (one of whom was the first author of this manuscript) and a trained focus-group observer who made notes regarding participant interaction and nonverbal cues conducted

the FGDs. Both the facilitators and the focus-group observer were female, registered dietitians, proficient in both English and Afrikaans and trained in qualitative research methods. At the time of data collection, one facilitator (first author of this manuscript) worked in higher education as a lecturer/researcher and the other facilitator and focus-group observer worked in the private sector (detailed information on the sampling of participants and method of data collection for phase two is described elsewhere).[17]

In order to provide guidance and make recommendations for the design of new HELs, participants were asked during the FGDs to comment on the overall design, use of colours, symbols, wording, and their understanding of existing international and South African HELs. The focus-group recordings were transcribed and content analysis was performed using deductive reasoning processes. A summary of the findings was provided to an independent graphic design company, consisting of a team of nine graphic designers, situated in the Western Cape, SA, who then designed ten HELs after meeting with the researcher where the background to the study was provided.

To evaluate the design of the logos and to eliminate five of the HELs, 23 experts were identified and contacted to participate in two rounds of scoring and evaluating the logos in September 2016. A modified Delphi technique was employed for this purpose, as it is a flexible approach[18] that brings together and synthesises the knowledge of a group of geographically scattered participants.[19] Nineteen experts agreed to take part. Four declined, owing to other commitments. After signing the confidentiality agreement, the experts were provided with the protocol synopsis for background information and information on the process to be followed during the rounds of scoring. They were also informed that all communication would be conducted via email. During all communication, the experts were blind copied (bc'd) to ensure anonymity of the experts.

In round one, the 10 logo designs were sent to the experts to score and make recommendations to improve the design. The experts were also provided with the same summary (feedback from phase two FGDs) compiled for the graphic design company. Experts were asked to complete a scoring sheet with space for comments on the design of each logo. After round one, the three lowest scoring HELs were eliminated and the comments

summarised for the graphic design company to improve the design of the remaining seven logos.

In round two, the remaining seven logos, with improved designs, were once again sent to the experts to score and make recommendations to further improve the design. The experts were provided with the summary of feedback and scores from round one. Experts were asked to complete a similar scoring sheet as used in round one with space for comments on the design of each logo.

After completing the second round of scoring and commenting, experts were thanked for their participation. The two lowest scoring HELs were eliminated and the comments summarised for the graphic design company to improve the design of the five remaining logos.

For the pilot testing of HELs in phase three, participants who participated in the interviewer-administered survey during phase one and/or the FGDs during phase two, were approached for participation in FGDs in October 2016. Participants were selected by means of purposive sampling according to their education level, the health district that they were recruited from in phase one, and their language preference. FGDs were arranged with 15 participants to allow for participants cancelling at the last minute.

FGDs were conducted in Afrikaans or English by a focus-group facilitator (the first author of this manuscript) and focus-group observer (the same focus-group observer used in phase two) who made notes regarding participant interaction and nonverbal cues. All FGDs were conducted at public libraries located in each of the four health districts where the original survey was conducted. The library chosen for each of the FGDs was private, comfortable, safe, free from disturbances, and conveniently located for the participants. Refreshments were served upon arrival of participants. Prior to starting the group discussion, the facilitator opened the discussion by welcoming the group and giving participants the opportunity to introduce themselves. The facilitator provided an overview of the topic, outlining the ground rules for the discussion (also in terms of confidentiality) and explaining the role of the observer and the recorder. The facilitator explained to the participants that the research was part of a PhD research study on food and nutrition labelling and that the facilitator and focus-group observer were employed (either part-time of full-time) by Stellenbosch University.

Participants were not informed that the facilitator and observer were registered dietitians, as it was felt that this might influence participant responses as they might think that they should provide answers a dietitian would want to hear. Written, informed consent was obtained from all participants as well as consent to record the discussion. A copy of the consent form was given to each participant.

Participants completed a short one-page demographic questionnaire and then the discussion commenced. No language barriers were experienced during any of the FGDs.

The facilitator used a discussion guide that was developed based on the research objectives of this study. The discussion guide consisted of two themes: ranking of HELs and a discussion of each of the five logos. Firstly, participants were requested to rank the logos (5 = "like the best" to 1 = "like the least") according to their personal preference, using a scoring sheet. Logos could not receive the same ranking, thereby forcing participants to rank the five logos according to their preference. This was done individually and participants were requested not to talk during this exercise. After completing the ranking of the logos, the discussion of each logo commenced. Box 1 provides a summary of the questions posed with regard to each logo.

Box 1: Questions posed during focus-group discussions with regard to each logo

- Please give your general impression of the logo?
- Do you like the design of the logo? Why do you like / dislike the design?
- How do you feel about the colours and fonts that were used?
- In general, is the logo attractive to you? Please explain.
- Is the picture/symbol used in the logo acceptable? Please elaborate.
- If you were to look at the logo for the first time on a product, what would you understand about this specific logo?

Participants were compensated with a food voucher for their time and travel expenses. All FGDs took between 45 and 60 minutes.

All personal identifiers were removed from the audio recordings before the transcription of the discussions and participant details were kept separate from the audio recordings at all times. The audio recordings of the FGDs were transcribed verbatim by an independent company specialising in transcription services. After the FGDs were transcribed, the

researcher (first author of this manuscript) performed quality control on the data to ensure that information was captured accurately. The transcriptions were then entered into a text-analysing computer program (Atlas TI version 7). The researcher went through the transcripts systematically while applying a process of open coding to the text. The researcher made notes of the main themes that could be established around the key concepts explored in the FGDs. The analysis can therefore be described as deductive (pre-prepared structure).

Data from the short demographic survey and the scoring of the HELs was captured using Microsoft Excel 2013 and summary statistics were used to describe the variables.

RESULTS AND DISCUSSION

Background information of participants

Table 1 provides a summary of the demographic information of participants who participated in the FGDs in phases two and three. The majority of participants who took part in phases two (79.2%) and three (88.9%) were female and had a total household monthly income of less than R6400 per month (53.7% in phase two and 77.8% in phase three).

Table 1: Demographic profile of focus-group participants from phase two and three

	Phase two (*N* 67)		Phase three (*N* 36)	
Mean age	42.76±15.42 Range: 18–72 years		46.58±16.95 Range: 20–72 years	
	n	**%**	***n***	**%**
Gender				
Male	14	20.8	4	11.1
Female	53	79.2	32	88.9
Race				
Black	11	16.4	4	11.1
Mixed Race	38	56.7	21	58.3
White	14	20.9	11	30.6
Asian	2	3.0	0	0
Other	2	3.0	0	0
Home language				
Afrikaans	29	43.3	23	63.9
English	22	32.8	10	27.8
isiXhosa	10	14.9	2	5.6
Other	6	9	1	2.7
Relationship status				
Single	24	35.8	12	33.3
In a relationship	10	14.9	4	11.1
Engaged	3	4.5	1	2.8
Married	22	32.8	13	36.1
Divorced	5	7.5	1	2.8
Widow/widower	3	4.5	5	13.9
Education level				
Completed grade 7	9	13.4	6	16.7
Some secondary schooling (Grade 8–11)	28	41.8	14	38.9
Completed Grade 12	20	29.9	9	25.0
Post-school qualification (diploma/degree)	10	14.9	7	19.4
Total household income				
No income	3	4.5	10	27.8
R1 – R1600	9	13.4	6	16.7
R1 601 – R3 200	14	20.9	3	8.3
R3 201 – R6 400	10	14.9	9	25.0
R6 401 – R12 800	7	10.5	1	2.8
R12 801 – R25 600	3	4.5	2	5.5
R25 601 – R51 200	4	6.0	1	2.8
R51 201 – R102 400	0	0	1	2.8
R102 401 or more	1	1.5	1	2.8
I do not know	8	11.9	0	0
I do not wish to tell you	8	11.9	2	5.5

Findings from phase two FGDs

Results from the nine FGDs conducted in phase two will be discussed according to different themes. The first theme relates to participants' perceptions towards the use of a single HEL to be used for healthy food choices based on the South African nutrient profile model. The second theme relates to the expectations and preferences of participants with regard to the design of an HEL, including the use of colour, symbols, wording, comprehension, and overall design.

Theme 1: Exploring the perceptions of participants with regard to the use of a single HEL

Participants were positive about the use of a single HEL on food labels in SA, while many said that they would prefer only one logo to be used. When asked why they would prefer a single logo, participant responses varied. Some indicated that it would simplify the label and reduce the amount of information on the front of the package as the information provided can be overwhelming. Many felt that it would make the label less confusing:

> *There are too many different logos and symbols on the packaging – I don't even know where to look.* [Grade ≥12 NINR]

This is justified, as there are currently a substantial number of HELs approved by the Director-General of the Department of Health, SA, that may be used on food labels. Some South African food labels contain up to five logos or symbols on one food label. This was an issue for many participants, as they felt that they did not always understand the meaning of all the logos. It was also clear that some logos were completely misunderstood, for example, the Cancer Association of South Africa (CANSA) logo:

> *I don't buy products with the CANSA logo because I don't have cancer.* [Grade 7-11 NIR]

Participants said that they struggled to understand the nutrition information on food labels, especially the information provided in the nutrition information table. Reading and interpreting this information can also be time consuming. Participants felt that the presence of a single HEL would make selecting a healthy product easier:

> *I don't understand all the numbers and detail at the back, so I just ignore it. But if there was a logo on the front that told me something is healthy ... and I know I can trust it, then I would buy it. It is important for me that I buy healthy food for my family, but I really struggle with all the [nutrition] information.* [Grade 7-11 NIR]

These findings are similar to those of several other studies that have reported food labels using graphics and symbols to convey the health properties of a product to be more effective than the traditional nutrition information table.[20, 21] Well-recognised HELs[22] and traffic light symbols have been found to be particularly effective.[23]

Participants expressed the need for more consumer education in the form of media campaigns, as well as education in schools, to create more awareness for HELs and to communicate the meaning of such logos. This will assist them in recognising the logo and understanding its intent. Research has shown that the success of a labelling scheme that uses HELs is dependent on media campaigns to communicate the meaning of the logo to the public and through communication campaigns implemented during the first year the logo is introduced.[14]

There were a few participants who had some concerns about the use of a single HEL on all food products. Participants who know and trust existing HELs such as the Heart and Stroke Foundation South Africa and the Glycaemic Index Foundation South Africa logos were worried that these logos would be removed from food products and that they would have to *get to know a new logo all over again*. A few participants were also concerned about the specific criteria that would be used to determine whether a product would qualify to carry such a logo, *who would be responsible to police* this process and whether these food products would be more expensive if they carried the logo. This emphasises once again the need for continuous consumer education if such a logo were implemented to address consumer fears and concerns and to ensure consumer understanding of the meaning of the logo.

Theme 2: Consumer expectations of and preferences for the design of HELs

During the discussions, participants were given examples of existing national and international HELs, to elicit a discussion on their preferences and expectations in terms of overall design, the use of colours and symbols, specific wording, and their general understanding of these logos.

In terms of overall design, it was clear from the discussions that participants would prefer a simple, easy to understand logo. The logo should attract their attention and should be easy to identify on a 'busy' food label. A study conducted by Becker *et al*. found that front-of- pack labels are particularly effective when using colours and designs that draw attention, and that

this occurred even when consumers did not have a nutritional goal, thus reaching a larger segment of consumers.[24]

The majority of participants indicated that the logo should include wording related to health such as healthy choice, healthier choice, better choice, best choice, in English, although the symbol or picture on the logo should also relate to health, nutrition or a healthy lifestyle. A few individuals did indicate that they would prefer the logo in more than one of the official South African languages, although they did agree that this would be difficult since SA has 11 official languages. The size of the font should be large enough to read easily, while the font itself should be 'simple' or 'plain'. This is in line with previous research conducted in SA and internationally where the size of the font used on food labels has been reported as a barrier to reading nutrition information, with consumers preferring larger, more legible fonts.[12, 16, 25]

Participants preferred bold colours such as green, orange, red and blue, while dull and neon colours were disliked by many as they were seen as *artificial*.

Results from phase three: Scoring, improving and elimination of HELs

Based on the feedback received during the FGDs in phase two, a comprehensive summary was compiled for the independent graphic design company for the design of ten HELs. These designs are shown in Figure 2.

Figure 2: Health-endorsement logo designs based on feedback from phase two focus-group discussions

These designs were given to the 19 experts to score based on the following criteria (weighted according to importance as determined by the researchers): overall design (30%), consumer understanding (30%), use of colours (20%) and use of symbols/wording (20%). Overall design and consumer understanding were considered the most important aspects of a HEL as it was considered crucial that consumers should understand the message the logo intends to convey, without any prior exposure to the logo.

The scores for the ten HELs are shown in Figure 3. The scores were determined by calculating the mean score for each criteria (overall design; consumer understanding; use of colour; and use of symbols/wording) and then calculating the total score, where each criteria contributed a specific weight to the final score. During round one of scoring, the three lowest scoring logo designs (logos D, I and J) were eliminated, based on the calculated total scores.

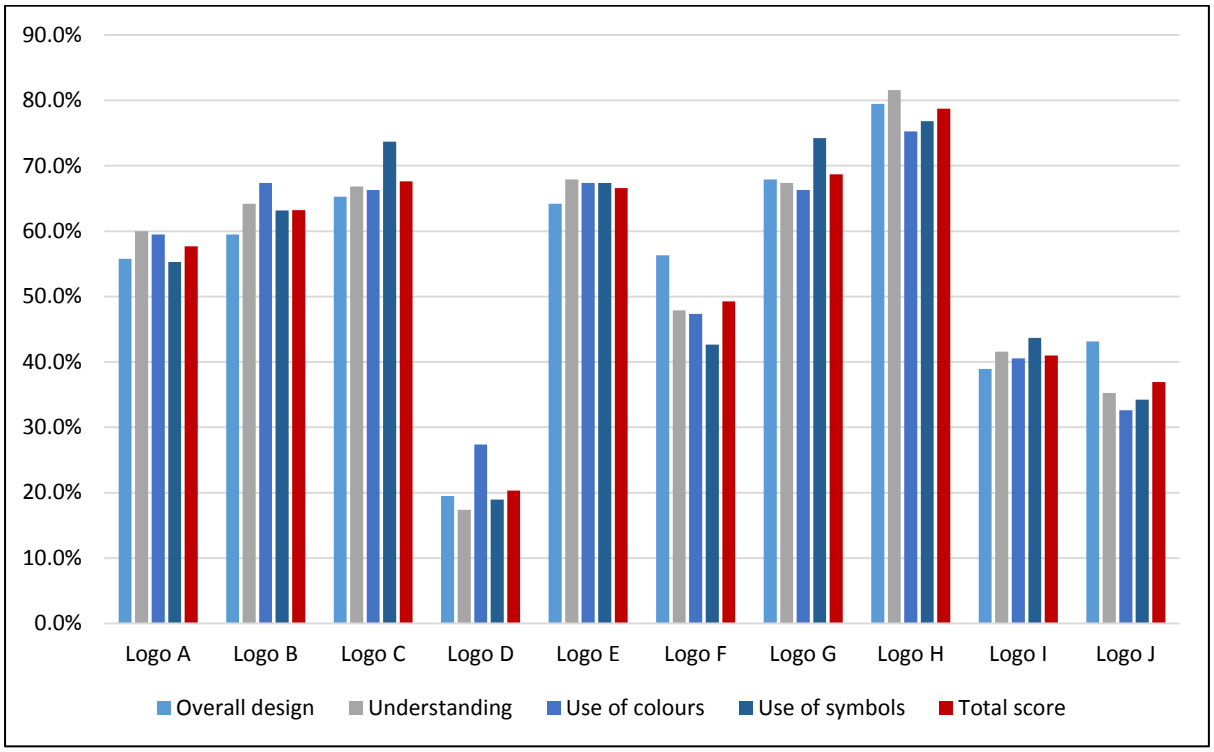


Figure 3: Round one scoring of health-endorsement logos by the group of experts

Experts were also given the opportunity to comment on the overall design, consumer understanding, use of colours, use of symbols and/or wording of each logo. From these comments, a comprehensive summary was compiled for the graphic design company to improve the designs of the seven remaining logos. All comments were included in the summary, although if several comments were made that eluded to the same suggestion, it was only stated once. Comments were not included if it contradicted the current labelling legislation. The improved/adapted designs are shown in Figure 4.

Figure 4: Health-endorsement logos re-designed based on feedback from the group of experts provided in round one

During round two of scoring, logos were scored according to the same criteria as round one and once again weighted according to importance. The scores for the seven HELs are shown in Figure 5. During this round, a further two logo designs were eliminated (logo B and E) based on the calculated total scores. Experts were then given a final opportunity to comment on the overall design, consumer understanding, use of colours and symbols, and/or wording of each of the remaining five logos.

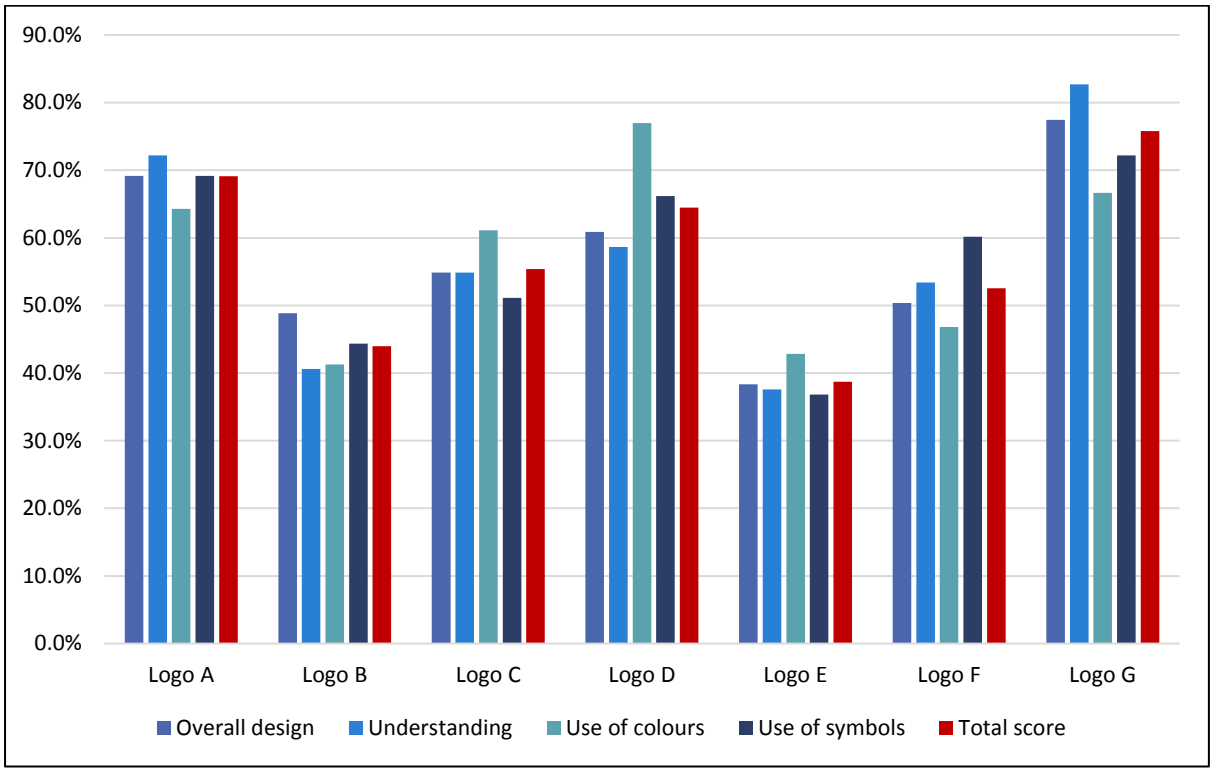


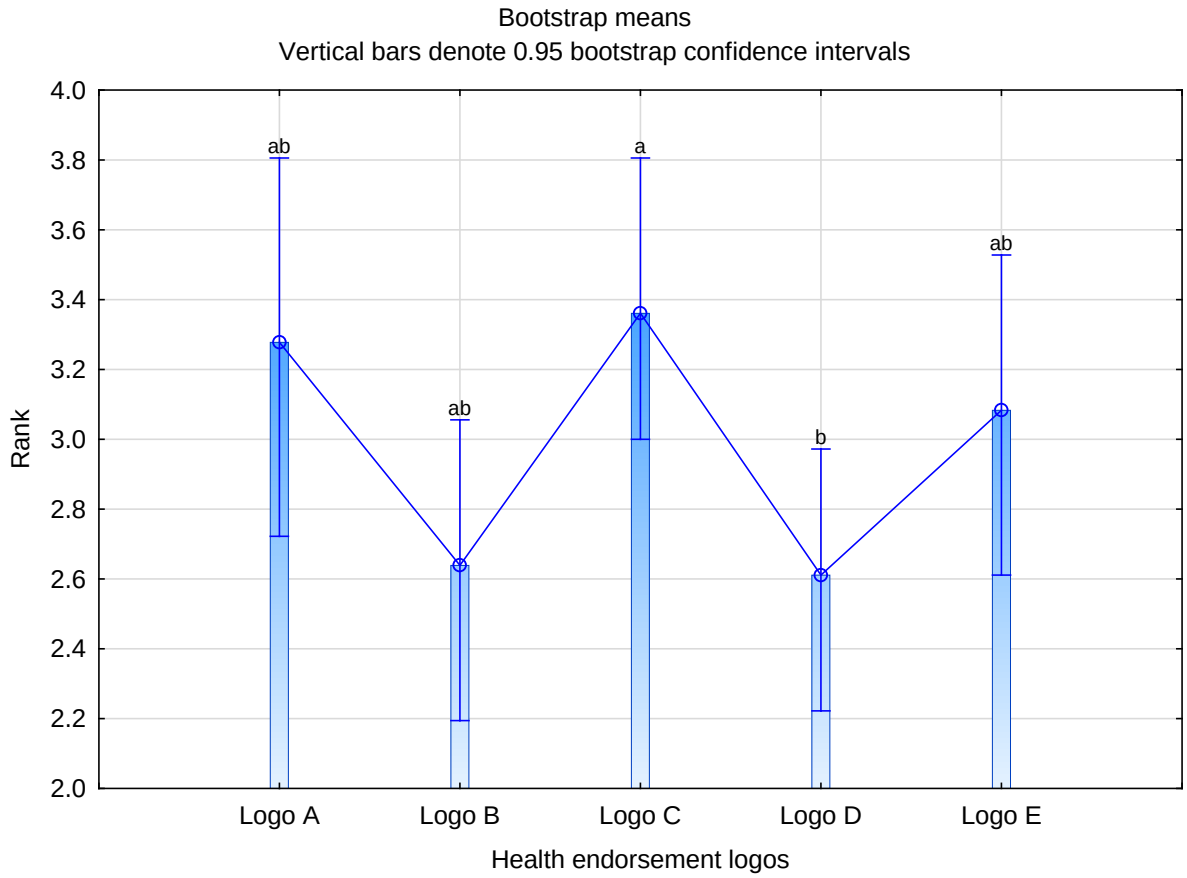
Figure 5: Round two scoring of health-endorsement logos by the group of experts

From these comments, a comprehensive summary was compiled for the graphic design company to improve the designs of the five remaining logos to be pilot tested in FGDs with consumers. The improved/adapted designs are shown in Figure 6.

Figure 6: Health-endorsement logos re-designed based on feedback provided by the group of experts in round two

Results from phase three: pilot testing of HELs

Consumers were asked to rank the five HELs according to their preference. The overall ranking for each of the five HELs are shown in Figure 7. The three logos that received the highest overall ranking were logos A (3.28/5), C (3.39/5) and E (3.08/5). A statistical significant difference was found between logos C and D (p=0.03).



*Statistical difference between Logo C and D p=0.03

Figure 7: Consumer ranking of health endorsement logos

From the four FGDs conducted in phase three (*N* 36), it was clear that participants preferred the designs of logos B and D the least. The main reasons were that there was no clear link with health, food and nutrition, while many said that the logos were *boring* and the colours d*ull* and *too medical*.

Participants were positive about the design of logo C, indicating that the logo is easy to understand and that there is a clear link with health and food. Comments were made that the logo has a *positive* and *happy* feel. Participants said the colours used in this logo reminded them of nature and health, while the font was legible.

The designs of logos A and E received mixed reactions. Some participants liked the designs, indicating that an apple is a good symbol of health – some participants specifically mentioned the well-known saying of *an apple a day keeps the doctor away*. Many, however, found the use of a specific food (apple) in the logos confusing: *a logo containing an apple on a box of lasagne, for example, would be very confusing ... someone might think that the lasagne literally contains apple.*

In terms of consumer understanding of these logos, almost all participants agreed that the logo should contain the wording 'Healthy Choice' and not 'Healthier Choice' and that the picture or symbol used in the logo should have a clear link with health, food or nutrition. By including both these elements, consumers felt that the meaning of the logo would be clear, even without prior exposure to the logo.

With regard to the various colours used in the logos, participants were of the opinion that different greens, yellows, oranges and browns work well on food products, as these colours symbolise health and food. Although many consumers liked the red in the logos, some indicated that too much red could indicate danger and thus imply foods to avoid. Many felt that bright and light blues were not appropriate to use on food labels as they were associated with medicine and cleaning agents: *Logo B reminds me of something I can find on a bottle of Domestos* (a household cleaning range)*. If it's blue, I think of cleaning.* These findings are to a certain extent, apart from the colours green and blue, similar to findings from research conducted by Wąsowicz *et al*. on the meaning of colours in nutrition labelling in the context of expert and consumer criteria of evaluating food product healthfulness. They found that consumers associate yellow, blue, certain shades of green and red with health, while purple, pink and other shades of green suggested an artificial and unhealthful product.[26]

When discussing the different fonts used on the various logos, participants said that they prefer clear, easy to read fonts in capital letters. The font should be big enough to read from a distance and more 'spaced out' (for example the font used in logo E was preferred to the font used in logo D).

Based on the scores and the discussions, logos B and D were eliminated, while logos A, C and E are recommended for further testing. Although logos A and E received scores above 60%, it is recommended that these designs should be re-evaluated and possibly adjusted, as

consumers had conflicting comments and suggestions on these designs, and that both the original and adjusted designs be used in further testing.

CONCLUSION

This study aimed to develop a set of HELs for food products that are healthy choices based on the South African nutrient profile model and to pilot test these logos on consumers.

Findings from the survey conducted in phase one and the FGDs in phase two suggest that the participants were positive about a single HEL to be used on food products in SA. Participants felt that it would simplify the nutrition information provided on food labels and would make the food labels less confusing.

The participants preferred simple, clear HELs with a direct link to health and/or nutrition. Bright, bold colours, a clear and easy to read message (containing the words 'healthy choice' in English) and a logo that would attract attention on a 'busy' food label were all mentioned as important characteristics of the design of an HEL.

After the design and re-design of several HELs based on the feedback of participants and a group of experts, three designs were found acceptable to the participants from Cape Town during FGDs, with one design particularly favoured. The final three logos will be recommended to the Department of Health SA, to consider for implementation after further testing.

Due to the nature of the study design and the small sample size, the findings cannot be generalized to the larger Western Cape consumer population and are only representative of the participants included in this study. Additionally, the nine provinces in SA differ significantly with regard to population size and ethnic groups, literacy levels, language, and access to housing, electricity and sewage, it is imperative to test these logos for acceptability and understanding in the different provinces of the country and to include especially illiterate consumers and those living in rural areas.

It is important to note that this study was based on self-reported preferences of consumers that included their preferences for specific designs, use of colours, use of symbols and their self-reported understanding of the HELs. Further research is recommended to determine consumers' actual preference and understanding of these logos.

With adequate and ongoing consumer education and support from various South African role-players, an acceptable single HEL could assist in the promotion of health and in addressing the high incidence of non-communicable diseases in SA.

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Chapter 7

Critical Discussion of Main Findings, Limitations, Recommendations & Conclusion

7.1 Introduction

In this chapter a summary of the study aims, objectives, design, and main findings is presented and discussed according to relevant literature. Conclusions are drawn and the limitations of the study and recommendations for future research are discussed.

7.2 Summary of study aims and design

Worldwide, there is growing awareness of and concern about the escalating burden of NCDs from a public health and economic perspective.[1] SA is no exception, with an increase in NCDs reported,[2] affecting quality of life and increasing healthcare expenses both at a personal and national level.[3] The risk factors associated with NCDs are well documented,[4] and considered modifiable through behaviour change or medications.[3] By eating a healthy diet, participating in regular physical activity, not using tobacco and avoiding the harmful use of alcohol, these risk factors will be drastically reduced. While deaths from NCDs mainly occur in adulthood, exposure to risk factors begins in childhood and builds up throughout life, underpinning the importance of legislative and regulatory measures, as appropriate, and health promotion interventions from within and outside the health sectors.[4]

In response to the increasing NCDs rates, many governments, including SA, have been (or are in the process of) revising their labelling and nutrition regulations as a means not only to meet food safety requirements but also as a government best practice for tackling nutrition-related NCDs.[5, 6] Although this is an essential step towards creating an environment where consumers can make healthy food choices based on accurate, honest and evidence-based information (specifically nutrition information), more should be done to assist consumers to utilise this information to make healthier food choices. To do this, however, a better understanding of the South African consumer is required.

Different front-of-pack labelling symbols and nutrition rating systems is one way of assisting consumers to make sense of the nutrition information provided on food labels in order to make healthier food choices.[7] In light of the new draft SA labelling regulations with the inclusion of a nutrient profile model, the possibility of a front-of-pack labelling system for SA was identified. In 2013, the research team had a meeting with the Department of Health, Directorate: Food Control where different possibilities for research in the field of nutrition

labelling and front-of-pack labelling approaches were discussed. During this meeting, the Department expressed the need for the development of a single HEL for SA. Based on the discussion, the research team set forth to also investigate the need for a single HEL for SA and to develop and pilot test these logos.

With limited research conducted in SA on consumers regarding food and nutrition labelling and considering the need expressed by the Department of Health for investigating a single HEL for SA, the following questions arose:

What is the knowledge of consumers regarding the nutrition information on food labels and do consumers read this information when purchasing food products?

What are the factors that influence consumer food purchasing?

What are the expectations of consumers and their perceived barriers regarding nutrition information on food labels?

Is a single HEL for products that are healthier choices based on the South African nutrient profile model acceptable to consumers, and what is an appropriate design of such a logo for the consumer?

The main aims of the research were therefore:

1. To perform a situation analysis of consumer knowledge and reading of the nutrition information on food labels in relation to various consumer characteristics.
2. To explore the factors that influence the food-purchasing behaviour of consumers and to determine consumer expectations and perceived barriers regarding the nutrition information on food labels.
3. To determine the acceptability and appropriate design of a single HEL for products that are healthier choices based on the South African nutrient profile model.

Owing to the complexity of consumer behaviour, decision making and preferences,[8] it was argued that a mixed-methods approach was the only suitable methodology to address the aims of the research as this approach capitalises on the strengths of quantitative and qualitative approaches respectively.[9]

Therefore, a multi-phase, mixed-methods study was conducted in three phases in the City of Cape Town, Western Cape, SA, on literate, adult consumers who were their households' primary food purchasers.

The City of Cape Town was selected as the setting for this research as the majority of research done in SA on food and nutrition labelling has been conducted in the Gauteng and North West provinces of the country,[10-12] with the exception of one national study.[13] No research has been done to date focusing on consumers residing in the Western Cape province of SA. Each of the nine provinces in SA is unique as it differs significantly with regard to population size, literacy levels, ethnicity, language and access to water and sewage.[14] As the second largest city in SA, with 3 740 026 residents,[14] the city of Cape Town consists of various ethnic groups, people with severe income and educational inequalities[15] and individuals with different backgrounds, lifestyles, cultures and eating patterns, making it an ideal setting for investigating consumer behaviour, knowledge and habits with regard to food and nutrition labelling.

This research focused on literate consumers as the City of Cape Town has one of the highest literacy rates in the country, with approximately 90.1% of adults (aged 20+) having completed primary school.[16] The literacy rate is 10% higher than that of SA (79.2% for adults aged 20+) according to the 2011 census.[17] Additionally, consumers were required to read label information on an actual food label as part of phase one of the research.

Although children are assuming larger roles in consumer purchasing decisions, including household food purchases,[18] this research focused on the primary food purchaser of the household and therefore only adults (18 years or older) were included.

Data was collected in four of the eight health districts of Cape Town, selected based on the districts' better ethnic distribution (compared to other districts where some ethnic groups are poorly represented)[16] between black African, coloured (mixed race) and white individuals.

In phase one, a cross-sectional descriptive interviewer-administered electronic survey was conducted collecting mainly quantitative data. This method was employed as it provides insight into a population that is too large in order to study each individual[19] and can collect data on consumer behaviour.[20] Survey findings can also highlight important issues that raise questions to explore further using qualitative methods.[21]

Data was collected over a two-month period, from February to March 2016, at 16 randomly selected grocery stores from the four major food retailers in SA. Participants were approached to take part in the survey as they exited the grocery stores. The survey was compiled by the researcher and based on the objectives of the study. The survey consisted of six sections. Four sections consisted of a combination of questions adapted from existing questionnaires[13, 22-24] used in similar studies and newly constructed questions. The knowledge section of the survey was adapted from a knowledge survey compiled by Van der Merwe et al.[12] on South African consumers in Potchefstroom, North West province. A total of 960 participants took part in phase one of the study.

In phase two, research was conducted within a qualitative paradigm using an interpretative phenomenological approach. An exploratory research approach from an interpretative phenomenological point of view was considered suitable for this phase of the research, as it permits the exploration, description and understanding of actual real-life experiences of consumers.[25] FGDs were conducted with participants from phase one selected via purposive sampling based on their education level, language preference, health district where they lived and whether they read nutrition information on food labels (willingness to participate in phase two FGDs was determined at the end of the survey in phase one). Data was collected from May – June 2016. FGDs were held at public libraries in the four health districts selected for data collection in phase one. A total of 67 participants took part in phase two of the study.

In phase three (September – October 2016), a systematic approach was followed to develop and test HELs for healthy food products based on the SA nutrient profile model.

There is little evidence documented on the actual development process of a national HEL. From the available literature on the development of HELs, it is however clear that the process should be systematic, transparent and the meaning should be well communicated to the consumer in order for it to be effective.[26, 27]

HELs were developed by an independent logo design company based on the data collected in phase two. A modified Delphi technique, conducted with 19 experts in the fields of nutrition, food science, and food labelling from the public and private sector, was employed to eliminate lowest scoring HELs and to improve the design of the remaining logos. This was done through two rounds of scoring and the re-design/improvement of logos.

Once the design of the highest scoring logos was finalised, participants took part in FGDs to pilot test the logos. Participants were selected by means of purposive sampling according to their education level and the health district that they were recruited from in phase one (some participants who participated in the phase two FGDs also took part in the phase three FGDs).

The pilot testing consisted of individual ranking of logos and a discussion on the overall design (including use of colours, symbols and wording) and understanding of each logo. A total of 36 participants took part in the FGDs.

Two logos were eliminated based on the ranking, while the remaining three logos were finalised (with proposed changes based on the comments received). These designs will be submitted to the national Department of Health, Directorates Nutrition, NCDs, Health Promotion, and Food Control to consider for implementation after further testing in the different provinces in SA.

7.3 Critical discussion of main research findings

The research aims and subsequent objectives were addressed during the different phases of the study. For certain objectives, data collected in a previous phase informed the following phase or were explored further.

7.3.1 Participant demographics

A summary of the participant demographics for each phase is given, followed by a critical discussion of the main research findings for each research aim and subsequent objectives (findings from the various phases are discussed simultaneously).

7.3.1.1 Phase one – Interviewer-administered electronic survey

A total of 960 consumers participated in phase one of the study, thus reaching the initial target set during planning of the research. The mean age of participants was 38.13 (*SD*=14.64, Range: 18–91 years). Table 7.1 provides a summary of selected demographic characteristics of the study population compared to the demographic profile of the population of the City of Cape Town.[16] The majority of participants were female (67.7%), which was expected, as females are mostly responsible for food purchases in the household[12] The racial distribution of the participants was fairly close to the population profile, with a deviation of less than 4%

for each of the racial groups. The majority of participants were either black African (40.5%), mixed race (38.5%) or white (20.5%). Approximately 58% of participants had a Grade 12 or higher qualification, compared to 46.4% for the City of Cape Town, indicating a more educated population compared to that of the city.[16] Half of the participants (50.6%) had a total household monthly income, after deductions, of ≤ R3200 (approximately US$252.80[iii]). This is in line with data collected during the 2011 census, that found that 47% of residents had a total household monthly income of ≤ R3200. The mean number of children per household was 1.69, with 2.73 adults per household.

Approximately three-quarters of participants were not on any type of special diet (74.7%) or took any vitamin or mineral supplementation (78.2%). The self-reported chronic disease prevalence of participants (for all chronic diseases of lifestyle) was 22.5%, which is slightly lower than the findings from SANHANES I for the Western Cape. According to SANHANES I, the prevalence of self-reported chronic diseases of lifestyle among its Western Cape participants was 21.2% for high blood pressure, 1.8% for heart disease, 3.5% for stroke, 7% for high blood cholesterol and 6.7% for diabetes.[28]

[iii] Date of conversion: 14 June 2017

Table 7.1: Demographic profile of phase one study participants (N=960) compared to the demographic profile of the population of the City of Cape Town

	Phase one study population	City of Cape Town Census 2011[16]
	%	%
Sex		
Male	32.3	48.9
Female	67.7	51.1
Race		
Black	40.5	38.6
Mixed Race	38.5	42.2
White	20.5	15.7
Asian	0.5	1.4
Level of education		
< Grade 7	Excluded	9.9
≥ Grade 7	4.7	4.6
Grade 8–11	37.3	38.6
≥Grade 12	34.0	30.2
Diploma/Degree	24.1	16.2
Total household income after deductions		
No income	7.5	13.7
R1–R1600	22.6	17.3
R1601–R3200	20.5	16.0
R3201–R6400	23.5	14.5
R6401–R12800	10.3	13.0
R12801–R25600	9.4	11.8
R25601–R51200	4.0	8.7
R51201–R102400	1.5	3.6
≥R102401	0.6	1.4

It is important to note that due to the non-random sampling used to recruit participants at the grocery stores in phase one, findings cannot be extrapolated to all consumers in the City of Cape Town.

7.3.1.2 Phase two – FGDs

Phase one participants were asked whether they would be interested to take part in further FGDs in phase two and three at the end of the survey. If they were interested, they provided

their contact details to the interviewers, who subsequently contacted the participants to arrange FGDs for phase two and three.

Attendance to take part in phase two FGDs was confirmed with 90 potential participants from phase one (10 per FGD), although only sixty-seven participants (32 NIRs and 35 NINRs) arrived for the FGDs on the day. This is not uncommon, as last minute cancellations and 'no-shows' are a common occurrence when arranging FGDs and it is therefore prudent to over-compensate when organising FGDs.[29]

Taking into consideration that the sampling of phase two participants was purposive and relied on phase one participants' willingness to take part in FGDs in phase two, the demographic profile of participants differed from that of phase one.

The mean age of participants was 42.76 (*SD*=15.42, Range 18–72 years). The majority were female (79.1%). With regard to race, more than half were of mixed-race ancestry (56.7%), 20.9% were white and 16.4% were black African. Fifty-five percent of participants had between a Grade 7 and 11 level of education. Seventy percent of participants reported having a total household monthly income, after deductions, of ≤R6400 (approximately US$499.20). The high number of participants with a relatively low income could be explained by the incentive (R150) offered to take part in the FGDs. Individuals with no income or a low income might have been more motivated to attend the FGDs compared to those with a higher level of income. The mean number of children per household was 1.95.

7.3.1.3 Phase three – Group of experts and consumer FGDs

The group of experts consisted of 19 experts in the field of nutrition, food science, and food labelling, from both the private and public sector in SA.

Attendance to take part in phase three FGDs was confirmed with 60 potential participants from phase one (15 per FGD). In an attempt to increase the number of participants per FGD, more participants were recruited per FGD for phase three due to the high number of last minute cancelations and 'no-shows' in phase two. Thirty-six participants arrived for the FGDs on the day.

Taking into consideration that the sampling of phase three participants was purposive and relied on phase one participants' willingness to take part in FGDs in phase three, the demographic profile of participants differed from that of phase one and two.

The mean age of participants was 46.58 (*SD*=16.95, Range 20–72 years). The majority were female (88.9%). With regard to race, more than half were of mixed-race ancestry (58.3%), 30.6% were white and 11.1% were black African. Fifty-five percent had between a Grade 7 and 11 level of education. Seventy-seven percent of participants reported having a total household monthly income, after deductions, of ≤R6400 (approximately US$499.20). As with the FGDs conducted in phase two, this can possibly be explained by the incentive (R150) offered to take part in the FGDs. Individuals with no income or a low income might have been more motivated to attend the FGDs compared to those with a higher level of income. The mean number of children per household was 2.22.

7.3.2 Consumer knowledge and reading of the nutrition information on food labels in relation to various consumer characteristics

Objective 1: To determine consumer knowledge with regard to the nutrition information on food labels and Objective 3: To assess any relationship between consumer knowledge of the nutrition information on food labels and various consumer characteristics

The total mean food and nutrition label knowledge score of participants (*N*=960) was fair (44.4%) based on the performance-rating scale for nutrition knowledge developed by Whati et al.[30] The knowledge section of the survey consisted of four sub-sections with questions. These sections were: 1) locating of information, e.g. "what is the main ingredient of this product?"; 2) calculations based on the product, e.g. if you ate 100g of this food, how much total sugar would you consume?"; 3) nutrient content claims, e.g. "identify the nutrient content claims made on the product"; and 4) health-endorsement logos, e.g. "identify the health-endorsement logos on this product". The mean knowledge scores for sections on 'health-endorsement logos' (36.8%) and 'calculations based on the product' (38.2%) were the lowest, while higher scores were obtained for 'locating of information' (49.3%) and 'nutrient content claims' (50.9%). The lowest mean score for an individual question was 16.7% for calculating the correct number of servings in the box. This is of concern, as it could lead to incorrect nutrient calculations by consumers and/or incorrect amounts of a product

consumed. These findings differ from that of Van der Merwe et al. who investigated consumer knowledge of participants in Potchefstroom, North West province, SA. The knowledge questions used in the current study were based on knowledge questions developed by Van der Merwe et al., even though in the latter study a different food label was tested. Participants from Potchefstroom obtained much higher scores for all four sections compared to the participants from the City of Cape Town: 'locating of information' (86%), 'identifying symbols' (similar to the 'health-endorsement logo' section) (97%), 'manipulation of information' (similar to the 'calculations based on the product' section) and 'nutrient content claims' (50.5%).[12] These differences may be due to the different food labels that were used in the respective studies and/or the differences in consumer characteristics of the study populations. The participants from Potchefstroom had a higher level of education and higher level of income than participants from Cape Town.

These overall scores show that less than half of all consumers who participated in the survey were able to use and apply the nutrition information provided on the food label, indicating that they could struggle to make an informed healthy food choice based on their current knowledge. It should be highlighted that the mean knowledge score (determined by calculating the mean individual participants knowledge scores for all 11 questions) should be interpreted with caution as the knowledge section of the survey only included selected aspects of knowledge related to food and nutrition labelling and did not measure understanding. Even if a participant had the ability to recognize, locate and manipulate nutrition information on food labels, this does not necessarily translate into understanding, as the participant may not understand how to utilize the information in order to make healthy food choices.

It is clear from the findings that there are differences in food and nutrition label knowledge of consumers from different consumer demographics. Individuals with a higher level of education ($p<0.001$), higher level of income ($p<0.001$) and women ($p<0.05$) achieved higher knowledge scores. These findings are similar to findings from South African[12] and international research.[31] As expected, participants who indicated that they frequently read the nutrition information on food labels, also achieved significantly higher ($p<0.01$) knowledge scores. Similar findings have been reported by Drichoutis et al,[32] Lin et al[33] and Goldberg et al.[34]

Objective 2: To determine whether consumers read the nutrition information table, list of ingredients, health and nutrient content claims and Objective 3: To assess any relationship between consumer nutrition information label reading and various consumer characteristics

When purchasing a food or non-alcoholic beverage, 36.7% of participants never or seldom read the nutrition information (any or all information related to the nutritional content – nutrition information table, list of ingredients, nutrient/health claims) on the food label, 27.3% sometimes did, while 36.0% indicated that they frequently or always read the nutrition information. These results are similar to other studies conducted by Van der Colff et al., Van der Merwe et al., and Kempen et al.[10, 12, 35] in the North West and Gautang provinces of SA, but in contrast with a systematic review (including 120 articles from mostly First World countries) conducted by Campos et al. who found that regular use of nutrition information on food labels in the general population is generally high and typically above 50%.[31] Therefore, findings from this study, together with findings from other South African studies suggest that South African consumers have poorer nutrition information label reading habits compared to consumers in developed countries.

Reading of nutrition information on food labels mostly took place in the store (67.0%) and was most important to consumers (68.2%) when buying a product for the first time. This is understandable, as food purchases usually become a high involvement purchase[36] when a product is purchased for the first time[37] with consumers spending more time studying the information (including nutrition information) provided on the food label compared to habitual purchases.

When the different types of nutrition information provided on food labels were investigated separately, the reading frequency (for those who read the information sometimes, frequently or always) remained relatively low [nutrition information table (54.3%), list of ingredients (55.63%) and nutrient content and/or health claims (57.9%)].

When the reading frequency of nutrition information on food labels was compared to consumer demographic characteristics, it was found that older individuals (p<0.05), white participants (p<0.001), those with a higher level of education (p<0.001), higher income (p<0.001) and those on a special diet (p<0.001), read the nutrition information provided on

labels more frequently. These results are similar to findings from international research as reported by Campos et al.,[31] with the exception of age of nutrition label readers where the majority of studies found that middle-aged or younger adults were more likely to read the nutrition information on food labels. This study found no statistical difference between label reading frequency of men and women. This is surprising, as findings from international studies have overwhelming shown that women, irrespective of income or socio-economic status, read and use the nutrition information on food labels,[24, 32, 37-46] are more likely to trust nutrition information on food labels[41] and report that the information had influenced their food choices.[47] A study conducted by Jacobs et al. in North West province, South Africa, also found no statistical difference between label reading frequency of men and women,[23] suggesting that in the South African population, there might not be a relationship between gender and label reading.

Objective 5: To explore the reasons why consumers read or ignore the nutrition information on food labels

Reasons why consumers read or ignore the nutrition information on food labels were investigated in phase one and further explored in FGDs in phase two.

A wide range of studies have investigated the association between label reading, label use and health practices. Studies have shown that individuals with specific dietary requirements due to health conditions or food allergies and those following a healthy diet in order to prevent disease reported greater use of the nutrition information on food labels.[38, 43, 48-51] Similar themes emerged from the FGDs. Participants who read the nutrition information provided on food labels could be classified into three main categories: participant/s with family members with specific health conditions or food allergies/intolerance, those trying to lose weight or maintain their current weight, and those who want to maintain their health and prevent disease.

Participants read the nutrition information on food labels for various reasons. The three most popular reasons, according to the results from the survey, for reading the nutrition information on food labels, were to compare amounts of nutrients in different foods (22.7%); to determine the amount of a nutrient in a serving of food (21.1%); and to compare nutrient content in different brands of the same food (19.6%). Similar findings were also reported by

Jacobs et al.[23] and the FGDs in phase two, where it also emerged that participants mainly compare the nutrients in different foods to determine which products to buy.

More than two-thirds of participants who read the list of ingredients indicated that it was to ascertain the composition of a product. In the FGDs, many participants said that the order of the ingredients in the ingredient list gave an indication of the quality and healthiness of the product. In both the survey and FGDs, participants indicated that they also look for specific ingredients and additives which they wish to avoid. Kempen et al. also explored the reasons why consumers read the ingredient list on food labels in FGDs in North West province, SA and had similar findings. They found that consumers with allergies and intolerances read the list of ingredients to avoid specific ingredients, while consumers also use the information provided in the list of ingredients to make an assessment of the quality of the product (in terms of constitution or how pure the ingredients in the product are). [52]

According to the results from the survey, participants who read the nutrition information table mainly focused on energy (56.8%), fat (42.8%), protein (41.1%), sugar (37.0%) and vitamin and mineral (35.7%) content of food products. These nutrients are similar to those mentioned in the FGDs, with those suffering from heart disease, diabetes, and hypertension specifically mentioning fat and cholesterol, sugar, and fat and sodium respectively. This is justified, as these health conditions are all associated with an increased intake of these macro- and micronutrients and restrictions of these nutrients are recommended.[53, 54] RDA or NRV values provided in the nutrition information table were not mentioned by any participants during the FGDs as important when assessing the nutritional value of a food product.

Sugar (44.6%) and fat (52.7%) claims were by far the most important claims for participants who took part in the survey. According to Shine et al. consumers tend to look more closely at nutrients they wish to avoid.[46] Findings from this study is therefore in line with that of international research which has shown that the most commonly sought nutrients on food labels were fat, energy content, protein, cholesterol, carbohydrates, vitamins and minerals, and sodium information.[31]

From the FGDs it emerged that participants would rather look for a nutrient content or health claim on the front-of-pack, than read the detailed nutrition information provided in the nutrition information table. Although there are specific requirements according to the current

labelling regulations[55] with regard to the list of ingredients and nutrition information table, these findings suggest that more focus should be placed on providing simple nutrition information on the front-of-package that is easy to understand. For a knowledgeable consumer or those with a specific health condition or food allergy, the information provided in the nutrition information table and list of ingredients might be essential, but many consumers would prefer a 'summary' of all the information in a simpler format located on the food label in a place that is easy to see (such as the front-of-package).

Approximately 60% of participants said that they would buy or consider buying a product based on the presence of an HEL, while 7 out of 10 participants said 'yes' or 'maybe' when asked if they would prefer a single HEL to be used on all food products. These findings have been emphasised in previous research conducted by Hawley et al. and Wills et al. who found that food and nutrition labelling can be more effective if simple graphics, symbols, and logos are used.[56, 57] From the FGDs it emerged that different HELs currently used on South African products are important indicators of the healthiness of a food to different consumers for various reasons. The Heart and Stroke Foundation South Africa Heart Mark was the most well known and recognised HEL according to participants.

Reasons why participants ignore the nutrition information on food labels were diverse. Results from the survey indicate that 34.3% of participants said that they bought the same type of product all the time and 26.1% said that they always bought the same brand. This does not necessarily mean that these consumers are not interested in the nutrition information of a food product, but could be due to them having read the information before. From the FGDs it emerged that some participants were loyal to certain brands and trusted the brand implicitly, therefore not seeing any value in reading the nutrition information of these products. Many participants felt that irrespective of the nutritional value of food products, price remained the most important factor when deciding which products to buy, and for this reason they did not read the nutrition information on food labels. Nayga et al. and Drichoutis et al. have reported similar findings, indicating that food shoppers who placed less emphasis on price, were more likely to read and use the nutrition information on food labels.[50, 51]

It is alarming that 31.4% of participants said that they were just not interested in the nutrition information provided on the food label. When this topic was further explored during the FGDs, a lack of time due to work, busy schedules and children was mentioned often as a reason for choosing to ignore the nutrition information. Lin et al. and Drichoutis et al. have reported that consumers who spend more time, or report having more time to shop for groceries, were more likely to be interested in the nutrition information provided on food labels.[33, 50] Another issue that emerged during the FGDs was a lack of trust in the information provided on food labels.

From the FGDs it became apparent that many participants struggle to understand the nutrition information provided on food labels, especially the nutrition information table and the list of ingredients, even though only 14.7% of consumers taking part in the survey cited this as a reason for not reading the nutrition information on food labels. Participants felt that they did not know how to interpret the information in the table and how to make healthier food choices based on the information provided, while the terminology used in the list of ingredients was sometimes too complex. Cowburn et al.,[58] Baltas et al.,[59] Drichoutis et al.[60] and Mhurchu et al.[61] have all reported that consumers struggle with the quantitative information presented on food labels. This emphasizes the need for simplifying food labels for consumers (while staying within the limitations of the current food labelling regulations) and consumer education, to assist consumers to make healthier food choices by utilising the nutrition information on food labels, at the point of purchase.

7.3.3 Factors that influence the food-purchasing behaviour of consumers and consumer expectations and perceived barriers regarding the nutrition information on food labels

Objective 4: To explore the self-reported factors that influence food purchases of consumers

Self-reported factors influencing food-purchasing behaviour were investigated during phase one of the study and further explored during the FGDs in phase two. Results from the survey indicate that the following food-labelling factors influence the majority of participants: sell-by/expiry date (89.2%), food products on special or promotion (87.1%) and price (81.3%). Jacobs et al. also reported that sell-by/expiry date was the most important factor consumers considered when buying food products.[23] This was explored further in the FGDs where many

participants indicated that sell-by/expiry dates particularly influenced their purchases of perishable products and that it sometimes determined the brand purchased. Some consumers even indicated that they would buy expired products from informal shops, even if they were aware of the risks, because these products are sometimes less expensive. According to focus-group participants, price and whether products were on special or promotion had a major influence on their food-purchasing decisions. For lower-income participants, price was sometimes the only determining factor when making food purchases. This is understandable in the current economic climate, although it is unfortunate that some participants perceived healthier food products to be more expensive. Price of food as a barrier to a healthy diet have also been reported in international studies, [62] thus emphasizing the need to educate consumers about less expensive food products considered healthy and how to plan a healthy diet on a very strict budget. Brand or manufacturer was also an important influencer for 58.2% of participants, with higher-income participants from the FGDs saying that it sometimes overrode the importance of price as certain brands were associated with better quality, taste and reliability therefore providing more value for money. These findings are also reported in studies conducted by Lamb et al. and Sanlier et al.[63, 64] Other factors emerging from the FGDs included reward systems offered by retailers and product marketing, specifically marketing aimed at children. The use of reward systems offered by retailers can provide an opportunity to promote healthy eating if retailers were to offer rewards on healthy foods rather than unhealthy items. Research has shown that children have a significant influence on food purchases in the household[18] and that product packaging play an important role in their food preferences (for example cartoons and characters displayed on packaging). Since characters and cartoons are often used to market unhealthy foods to children, the new draft labelling regulations[65] include a section dedicated specifically to address the advertising of foods and beverages to children in SA. Although these regulations have not been implemented yet, these regulations are a step in the right direction to address the rising overweight and obesity rates of children in SA.[28]

With regard to product packaging material and size, 43.8% and 52.6% of survey participants said it influenced their food purchases. The attractiveness of the packaging, whether packaging could be re-used at home or if it was made from recyclable material was important to some. It was interesting that some participants associated attractive packaging with a

better quality and more expensive product, while plain packaging was associated with better value for money. Venter et al, who conducted exploratory research on consumers' perception of food packaging in Potchefstroom, North West province had similar findings.[66]

Only 18.8% and 34.3% of survey participants indicated that genetically modified related claims and organic claims were an important influence when making purchasing decisions. From the FGDs it emerged that many participants did not purchase organic produce owing to its perceived high cost and limited availability. The perceived high cost of organic food has also been reported in other studies as an important obstacle to its purchase.[67] The majority of participants taking part in the FGDs were unfamiliar with genetically modified products. This is concerning, as many South Africans consume genetically modified maize on a daily basis.

More than half (52.7%) of participants taking part in the survey indicated that convenience was an important factor influencing their purchasing behaviour. This was further discussed in the FGDs and it emerged that feelings about ready-made meals or convenience foods were mixed. Reasons provided for preferring ready-made meals included lack of time and effort, while others were of the opinion that these meals were of inferior quality and taste, and unhealthy.

According to Mullins et al., food customs involve inherent, strong beliefs, norms and values that directly influence food choice in society.[68] It is therefore not surprising that many participants taking part in the FGDs also emphasised the important influence of family members and their food preferences/restrictions, household size, and their culture and religion.

Regarding the nutrition information provided on food labels, only half (51.9%) of survey participants said that the list of ingredients would influence their food purchasing. Jacobs et al. had similar findings and reported that consumers from Potchefstroom, North West also seemed unconcerned about which ingredients were present in foods.[23] Findings from this study and results reported by Jacobs et al.[23] suggest that consumers are either simply not interested in the information in the ingredient list, or alternatively, could have difficulty understanding the complex terminology used in these lists, thus highlighting, once again for simpler, easy to understand information. The nutrition information table, nutrient content

and health claims, and HELs fared even worse, with only 47.1%, 42.8% and 33.2% of participants indicating they would have an influence. During the FGDs, many participants said that although they found the nutrition information on food products interesting, it did not always influence their purchasing behaviour, as other factors such as price and taste were more important.

Findings from the FGDs suggest that participants prefer the list of ingredients, nutrient content claims and HELs as their source of nutrition information, rather than using the nutrition information table. The use of claims (such as nutrient content claims and health claims) and HELs are both labelling strategies used in order to highlight the most important nutritional aspects of a food product on the front-of-package. This can help consumers to make a healthier food choice, without having to understand or interpret the nutrition information table.

It is important to note that this study determined and explored the self-reported factors influencing food purchasing behaviour. Participants may have over- or underreported the importance of certain factors influencing their purchasing behaviour, for whatever reason.

Objective 6: To explore consumer expectations and perceived barriers of the nutrition information on food labels

Consumer expectations and perceived barriers with regard to the nutrition information on food labels were investigated in the survey in phase one and further explored during the FGDs of phase two.

Participants felt that too much information, including nutrition information, is sometimes displayed on food labels and this can become intimidating. For many participants the actual font size of label information is problematic (69.2%), as they struggle to read the information. Participants said that they would prefer simpler labels with more pictures and colour (71.2%), as this would make the labels more user friendly and less overwhelming. Consumer preference for simpler food labels using more graphics and symbols have also been reported by Marino et al.,[69] Lewis et al.,[70] and Geiger et al.[71]

In general, participants want food labels to be attractive and colourful, and preferably to include pictures of actual products and preparation instructions. Signal et al. found that

information accompanied by graphics helped consumers to better apply reference information, especially consumers who have not seen the label before.[72]

Results from the survey show that the majority of consumers (79.7%) would prefer food labels with less complex terminology. Participants, similar to findings reported by Jacobs et al.,[23] felt that the terminology used in the list of ingredients was sometimes difficult to understand and would prefer simple ingredient names. Additionally, participants struggled to understand the nutrition information table (42.7%). Research conducted by Abbott et al. also indicated that consumers tend to prefer food labels with minimal numerical content.[43] Participants indicated that they preferred using nutrient content and/or health claims, HELs and a summary of nutrients (similar to the traffic-light label) on the front-of-pack to assess the nutritional value of food products to determine whether the product was a healthy choice. In the international research, well-recognized HELs[73] and traffic light symbols[74] have been found to be particularly effective in helping consumers identify healthier food options at the point of purchase.

Participants said that they would prefer more standardised front-of-package labelling, saying that it would be easier to locate important information. Considering these comments, it is encouraging to note that the Department of Health has included a section on front-of-pack labelling in the draft legislation,[65] providing guidelines for the use and requirements thereof.

Three-quarters (73.3%) of participants said that they would prefer a single HEL to be used on food products, as the different HELs currently used on food products in SA were confusing. This is understandable, as some products in SA currently have more than five HELs on the front of the food label. Participants also said that they did not understand the meaning of all the current approved HELs, indicating the need for consumer education when a HEL is introduced on food products.

Although the actual language used on the food label was not a barrier for two thirds of participants (67.5%), participants taking part in the FGDs expressed a need for using more than one SA language on food labels, although they indicated that this might cause further information overload on labels. Although participants with different home languages were included in the study, it is important to note that those who took part in the survey and FGDs could all read and understand English, and therefore the language used on food labels might

be of bigger concern amongst consumers who do not speak, understand or read English or struggle to do so. Since SA have 11 official languages, it is important to conduct this type of research on South African consumers who do not understand English, as they will experience other barriers, and have different expectations regarding food and nutrition labelling.

Taking into considering the self-reported factors influencing consumer food purchasing behaviour and the perceived barriers and expectations of consumers with regard to the nutrition information on food labels, a careful balance must be maintained in order to provide the required nutrition information on food labels (according to the current food labelling regulations),[55] while satisfying the needs and expectations of consumers to simplify food labels.

To summarise, participants have expressed the need for a simpler food label that is more visually appealing (colours and pictures), with less complex information (specifically related to the nutrition information) that is easier to understand and read. Standardized front-of-pack labelling and a front-of-pack labelling scheme, such as a single HEL, could provide a possible solution. However, these expectations and consumer preferences can pose a challenge to food manufacturers as they will need to be innovative and creative in the design of food labels within the limitations of the available space on labels, cost and the different regulations applicable to the labelling of certain foodstuffs.

7.3.4 The acceptability and appropriate design of a single HEL for products that are healthier choices based on the South African nutrient profile model

Objective 7: To explore what type of HELs are preferred and why

When reporting on the preferences of consumers, the distinction should be made between self-reported preferences and actual preferences. In the FGDs, consumer preferences in terms of the design of HELs were investigated. This method relies on consumers' self-reported preferences, although in practice, their actual preferences may differ from their self-reported preferences.

Findings from the phase one survey and phase two FGDs suggest that participants would prefer a single HEL to be used on food products in SA. Reasons for their preference of a single logo were explored during phase two FGDs. Some said that it would reduce the amount of

information on the front-of-package and that it would make the label less confusing. Participants felt that there were too many different HELs currently used on food labels. By introducing a single HEL for SA, it would ideally replace all other endorsement logos – therefore simplifying the front-of-package. Participants said that they struggled to understand the nutrition information on food labels, specifically the nutrition information table. Reading and interpreting this information can also be time consuming. According to these participants, the presence of a single HEL would make selecting a healthier product easier. It is however important to note that a single HEL will not replace the nutrition information table on food products. According to the current labelling legislation,[55] the nutrition information table is considered voluntary unless a nutrient content claim is made, however, the draft labelling legislation proposes a mandatory nutrition information table with minimum nutrition information for all food products (unless stated otherwise in the legislation).[65]

During the phase two and three FGDs, consumers discussed their preferences and expectations with regard to HELs in terms of their overall design (use of colour, symbols, and specific wording) and understanding. Participants said that they would prefer a simple (not too busy or complicated), easy to understand logo. The logo should attract attention and should be easy to identify on a busy food label. A study conducted by Becker et al. found that front-of-package labels are particularly effective when using colours and designs that draw attention, and that this occurred even when consumers did not have a nutritional goal.[75] The majority of participants were of the opinion that the symbol or picture used on the logo should relate to health, nutrition or a healthy lifestyle, as this would improve their understanding of the logo, even if the logo was unfamiliar to them. The meaning of certain symbols or pictures in different cultures should however not be ignored. Although the FGD participants in this study comprised of various ethnic and cultural groups, the opinions and preferences of all groups in SA should ideally be considered in testing of the logo.

Participants indicated that they preferred HELs to include wording in English and that the wording should relate to health, e.g., healthy choice, healthier choice, better choice, best choice. However, with the pilot testing of logos during the phase three FGDs, it was clear that there was an overwhelming preference for the wording ‘healthy choice’. If this wording were to be included on a single HEL, an amendment to the current labelling legislation will be

required in the form of an exemption (similar to that of the fortification logo for food vehicles) so that the word 'healthy' may be included on the logo. According to the current labelling legislation, the use of the words 'health' and 'healthy' is considered a prohibited statement.[55] Some participants said that they would prefer the logo in more than one South African language, although they agreed that this would be difficult since SA has 11 official languages. Preferences of consumers who do not understand or read English should also be determined before implementation of a single HEL, although it may be impractical to develop a HEL in all the official languages of SA. This demonstrates the need for a logo with a symbol or picture with a clear link to nutrition or health, so that consumers will be able to identify the logo and understand the meaning of the logo, without having to read the wording. This also applies to illiterate consumers.

Participants preferred bold colours to be used in the design of the logo, such as green, orange, red and blue, while dull and neon colours were disliked. However, with the pilot testing of logos during phase three FGDs, participants mostly favoured greens, yellows, oranges and browns and disliked blues. They were also wary of red, as it symbolised 'danger' to some. For certain colours (red, green and blue), these findings differ from research conducted by Wąsowicz et al. who investigated the meaning of colours in nutrition labelling in the context of expert and consumer criteria of evaluating food product healthfulness. They found that consumers associate yellow, blue, certain shades of green and red with health, while purple, pink and other shades of green suggested an artificial and unhealthful product.[76]

In this research study, consumer preferences for other front-of-package labelling approaches were not investigated as the need for the development and testing of a single HEL for SA was raised by the Department of Health, Directorate: Food Control.

For Objectives 8 – 10, the researcher reports on her observations of the process of logo development, pilot testing and subsequent recommendations for further testing. The main FGD findings from phase two and three were discussed in previous objectives.

Objective 8: To make recommendations to an independent logo design company for the design of HELs for products that are healthier food choices based on the South African nutrient profile model

Based on the feedback received from participants during the FGDs of phase two, a summary (Addendum M) was compiled for the independent design company to assist them in designing the HELs. This summary included general comments about the overall design preferences and expectations of participants as well as comments received on the design of existing national and international HELs. All comments were included in the summary, although if several comments were made that eluded to the same suggestion, it was only stated once. Comments were not included if it contradicted the current labelling legislation.[55]

Ten HELs were designed (Addendum P) based on this summary of findings from phase two. The ten designs were then scored by experts based on specific criteria determined by the researchers. Since no criteria have been reported in the literature to evaluate the design of HELs, the weighted criteria was pre-determined by the researchers based on their perception of the most important aspects of logo design.

Based on these scores, three HELs were eliminated. Comments from the experts on the overall design, consumer understanding, use of colours, use of symbols and/or wording of each logo were summarised (Addendum R) for the design company to improve/adapt the designs of the remaining logos. The improved/adapted designs (Addendum S) were once again scored by the experts based on the same criteria. Based on these scores, a further two HELs were eliminated. Comments from experts on the overall design, consumer understanding, use of colours, use of symbols and/or wording of each logo were once again summarised (Addendum U) for the design company to improve/adapt the designs of the remaining five logos.

To summarise, five HELs (Addendum V) were designed by an independent graphic design company based on the preferences and expectations of participants and two rounds of scoring and commenting, by experts (in the field of nutrition, food science and food labelling), to eliminate lowest scoring logos and to improve/adapt the designs of the final logos to be used for pilot testing.

Objective 9: To pilot field test the most suitable HELs among consumers and to determine their acceptability and understanding

The five highest scoring HELs were pilot field tested on participants in phase three FGDs.

Participants were asked to rank the five HELs according to their preferences. Three of the five HELs received an overall ranking of more than 3 out of 5 (3.08, 3.28 and 3.39 respectively). Ranking was done before the start of the discussion to minimize the potential influence group members' preferences and opinions had on one another. It was clear from the phase three discussions that the overall design of the two lowest scoring logos was least favoured and that participants struggled to make the connection with health, food and nutrition.

Participants were very positive about the design of the highest ranking logo, indicating that it was easy to understand and that there was a clear link with health and food. They said the colours used in the design (mostly greens and yellow) reminded them of nature and health, and that the font was easy to read.

The second and third highest ranking HELs received mixed reactions. Some participants liked the designs, while others had issues with the symbols used: many felt that using a specific food on a logo could cause confusion. The blue and red colours used in the logos reminded some participants of medicine and cleaning agents (blue), while red symbolised danger for some.

Based on the ranking and the discussions, the two lowest scoring HELs were eliminated.

Objective 10: To recommend HELs to the Department of Health, Directorates: Nutrition, NCDs, Health Promotion and Food Control, SA to consider for implementation after further testing

Five HELs (Addendum V) were pilot field tested during the FGDs in phase three. A summary (Addendum AC) of participant comments on the design of the three highest scoring HELs was compiled for the graphic design company and it was recommended that two of the designs be re-evaluated and adjusted as consumers had conflicting comments and suggestions on these designs.

The researcher recommends that the new proposed designs (Addendum AD) which have not been tested yet, together with the original three highest ranking designs be used for further testing by the Department of Health. Taking into consideration that a pilot field test was done, it is imperative to test these logos for acceptability and understanding in the different provinces of SA and to especially include consumers with low literacy levels and those living in rural areas.

Additionally, research to determine how the logo will be understood and used in practice is required.

7.4 Limitations of the study

The following limitations of the study were identified:

As part of the exclusion criteria for this research study, illiterate (low literacy) consumers were excluded as participants were required to read information provided on an actual food label during phase one of the study. These consumers were also excluded as the literacy rate of consumers from the City of Cape Town is relatively high,[16] with approximately 90% of consumers having completed Grade 7. Furthermore, the interviewer-administered electronic survey used in phase one was available in English only, since English is the main language used on food labels in SA and the participant was required to read nutrition information from an actual food label example. Participants were therefore excluded if they were not able to read and understand information provided in English. It is however believed that illiterate consumers and consumers who struggle to understand and read English would have provided valuable insights into some of the research questions.

The research study investigated consumers' self-reported nutrition label reading frequency and factors influencing food purchasing behaviour and actual nutrition label use and factors influencing food purchasing behaviour was not determined.

In this research study, consumer preferences for other front-of-package labelling approaches were not investigated as the need for the development and testing of a single HEL for SA was raised by the Department of Health, Directorate: Food Control.

7.4.1 Phase one

Considering that non-random sampling was used to recruit participants at the grocery stores in phase one, care should be taken to extrapolate phase one findings to all consumers in the Western Cape and SA, especially those from rural areas. Although convenience sampling was employed to recruit participants in phase one, grocery stores were randomly selected, while participants were recruited at different times of the day and different days of the week. This

was done in an attempt to incorporate aspects of representativeness into the non-random sample.

Although an interviewer-administered electronic survey has many advantages (as described in 3.7.1) and was considered the most appropriate and suitable data collection method for phase one, it was also time consuming and more expensive compared to a self-administered survey, thus allowing for less participants to be included in the study based on the available resources at the time.

Even though precautionary measures were put in place to reduce interviewer variation by training and standardization all research assistants before and during data collection for phase one, some interviewer variation may still have occurred affecting the overall quality of the data.

The total mean knowledge score reported in phase one was determined by calculating the mean of the individual participant knowledge scores for 11 questions. Although adapted from an existing knowledge survey developed by Van der Merwe et al,[12] the score should be interpreted with caution as the knowledge section of the survey did not include all relevant aspects of knowledge related to food and nutrition labelling and it did not measure understanding.

7.4.2 Phase two

Although the findings from phase two provide a comprehensive overview of the purchasing behaviour and motivations for reading or ignoring nutrition information on food labels of participants from Cape Town, SA, the qualitative and exploratory nature of the research does not allow the findings to be generalized to the larger Western Cape and South African consumer population.

Even though the FGDs were carefully planned, a pre-determined and pilot tested discussion guides used and the facilitators trained and standardized, the limitations of conducting FGDs should be recognized as it may have affected the quality of the data: 1) the number of questions and follow-up questions that could be posed were restricted in a group setting; 2) the available response time per participant was limited; and 3) participants who realised that their viewpoint is a minority perspective may not have been inclined to speak.

7.4.3 Phase three

Data collected during the FGDs in phase three were also qualitative in nature and can therefore not be generalized to the larger Western Cape and South African consumer population.

In order to stimulate conversation about what type and design of HELs consumers prefer and why, existing HELs were used during the FGDs. A summary of the FGD feedback was compiled for the graphic design company to use as a guide when designing the first ten HELs. The design of the existing HEL examples used in the FGDs, may have subsequently influenced the graphic design team when designing the new HELs.

7.5 Recommendations

For future research

Limited research has been conducted in SA since the implementation of the current labelling legislation to determine consumer knowledge of nutrition information on food labels, the nutrition label reading habits of consumers and to explore consumer nutrition labelling preferences and barriers to reading nutrition information on food labels. Research has been conducted in the Gauteng and North West provinces, and now in the Western Cape province of SA; however, owing to the diversity of the different provinces in terms of ethnicity, literacy levels, income levels, home language, access to water and sanitation, it is recommended that similar research be conducted in the other provinces of SA or on a national scale, and specifically in rural areas. A better understanding of the needs, preferences and food-label reading practices of SA can inform the design of education campaigns targeting specific sub-groups to encourage the utilisation of the nutrition information on food labels to make healthier food choices.

The majority of international research on food and nutrition labelling has been conducted with literate adults[77] and research examining the effects of literacy on usage of nutrition information on food labels is limited and practically non-existent in SA. Since consumers with lower literacy levels process and evaluate information differently than literate consumers,[78] it is expected that they would have different label-reading practices, face other barriers and have different expectations with regard to how nutrition information should be displayed on

food products. It is therefore recommended that targeting specifically low-literate consumers should be a priority for future research.

According to the South African food labelling regulations, *information required to appear on any label shall be in English and where possible, at least one other official language of the Republic of South Africa*.[55] This is rarely the case, as by far the majority of food labels are only in English. According to the 2011 census, isiZulu is the mother tongue of 22.7% of South Africa's population, followed by isiXhosa at 16%, Afrikaans at 13.5%, English at 9.6%, Setswana at 8% and Sesotho at 7.6%. Although most South Africans are multi-lingual, some do struggle to understand and read English. It is therefore recommended that future research focus on these consumers to gain a better understanding of how they grapple with labelling information in English and to determine how aspects of food labels can be simplified / adapted to their needs.

To determine actual consumer nutrition label use and understanding and not self-reported use and understanding in SA, it is recommended that future researchers use a combination of different data collection techniques (for example questionnaires where self-reported label use and understanding is determined and verbal protocol analysis where actual label use and understanding is determined.)

To gain better insight into the challenges facing the food industry with the implementation of the new SA food-labelling legislation, with a focus on the nutrition information provided on food labels, it is also recommended that research be conducted to explore the perspectives of South African food manufacturers and retailers.

For the Department of Health, Directorates Nutrition, NCDs, Health Promotion, and Food Control, SA

In SA, the Department of Health; Directorate: Food Control holds overall responsibility for the publication and amendment of South African labelling legislation. It is recommended that the Department should take note of the needs and expectations of the South African consumer (as determined by national research including the research conducted here) in order to improve and simplify the current legislation.

It is recommended that the three highest scoring HELs from the pilot field testing, with the adapted designs based on consumer feedback, be tested for acceptability, understanding and

actual preference in the different provinces of the country and to especially include low-literate consumers and rural areas (including rural areas of the Western Cape).

Once an acceptable logo has been identified by the Department of Health and appropriate consultation with other stakeholders, including the food and health industry, has taken place, it is recommended that a mass media campaign should be launched to communicate the meaning of the logo to the public and to incorporate the logo into all nutrition education programmes as well as the school curricula.

It is also recommended that the impact of a single HEL on consumer purchasing decisions should be investigated once the logo has been implemented in SA to determine its effectiveness and possible influence on health outcomes.

For the food industry

It is recommended that the food industry place a renewed focus on the design and layout of food labels and work with the Department of Health to apply the food regulations correctly. Within the boundaries of the current food-labelling regulations, industry should strive to provide nutrition information on food labels based on the preferences and expectations of South African consumers. This research suggests that consumers prefer simpler food labels with more pictures and colours, larger font sizes, less complex terminology and a standardised front-of-package labelling scheme.

7.6 Conclusion

This research found that participants from the City of Cape Town, Western Cape, SA, do not regularly read the nutrition information on food labels and do not consider it as one of the most important factors when purchasing a food product. As expected, it confirms findings from international research that demographic characteristics such as age, income and education have a major influence on nutrition information label-reading habits.[31]

The research findings suggest that product price, specials/promotions and trusted brands are more important to participants when selecting food products, even though some consumers felt that they would pay more attention to the nutrition information if price were not their primary concern. Other barriers to reading and utilising the nutrition information on food products were also identified: the food and nutrition label knowledge of participants was fair

or below average and it emerged that participants struggle to understand and use the nutrition information on food labels (the nutrition information table in particular) to make healthy food choices. These findings suggest that education campaigns should be designed to motivate more frequent label reading, targeting specific subgroups of the population. Educating consumers on the importance of the nutrition information on food labels and how to use the information correctly, while also paying attention to their limited resources and subsequent focus on budget, can increase the selection of healthier food options.

Participants preferred simpler food labels with more pictures and colours, larger font sizes, less complex terminology and a standardised front-of-package labelling scheme. With regard to the nutrition information on food labels, participants preferred nutrient content, health claims and HELs as their source of nutrition information as they struggle to understand the nutrition information table. To simplify food labels and to reduce confusion, nearly three-quarters of the participants indicated that they would prefer a single HEL logo to be used on food products in SA. The South African government and the food industry should pay attention to these preferences in order to improve food label design and to create labels conducive to a better understanding of the nutrition information on food products.

As a first step towards addressing these consumer preferences, HELs were designed according to the self-reported preferences and expectations of participants, with the main aim of creating a single HEL for use in SA. Five of these HELs were pilot field tested on participants from the City of Cape Town and three designs (with recommendations for improvements) are recommended to the Department of Health, SA, to consider for implementation after further testing to assist in the promotion of health and in preventing and addressing NCDs in SA.

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Addenda

Addendum A: Phase one - Permission letter

Store name and address
Date 2016

Dear (name of store manager)

REQUEST PERMISSION TO CONDUCT RESEARCH STUDY

I am a registered PhD student in Nutritional Sciences at the Division of Human Nutrition, Faculty of Medicine and Health Sciences at Stellenbosch University.

My research topic is: The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

The study will be conducted in three phases. During phase one of the study, the research team will conduct an interviewer-administered electronic survey with willing consumers outside sixteen pre-selected grocery stores around Cape Town. Sixty consumers will be randomly selected over a period of 6 non-consecutive days (provide dates here) as they exit the grocery store and approached to partake in the study.

The survey will involve participants having to answer questions about their food label use, understanding and practices as well as the factors that influence their purchasing behaviour. This interview will be conducted in a pre-arranged area outside the store and will take approximately 20-30 minutes. Written consent will be obtained from all participants before the start of the interview and all interviews will be treated as confidential.

To thank participants for their participation, they will receive a R50 shopping voucher (bought by the research team) from the store where data collection took place to compensate them for their time.

A copy of the research study protocol as well as the approval letter from the Health Research Ethics Committee from Stellenbosch University can be provided upon request.

As manager of a selected grocery store, I would like to request your permission to conduct this research outside your facility on the dates provided above.

I trust that my request will receive your favourable consideration.

Yours sincerely

Nelene Koen RD(SA)
B.Sc Diet (Stell) M Nutr (Stell)
PhD Student
nelene@sun.ac.za / 021 938 9256 / 0823718029

Addendum B: Phase one screening form

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

Participant Code: ☐

To determine whether you are eligible to be included in this research study, please answer the following questions:

Are you the primary food purchaser in you household? Do you do more than 50% of the grocery shopping?

	X	
Yes		Qualify
No		**Do not qualify**

Are you willing to give written consent to take part in this research study?

	X	
Yes		Qualify
No		**Do not qualify**

Are you 18 years or older?

	X	
Yes		Qualify
No		**Do not qualify**

Can you read and understand the **English** information provided on a food label?

	X	
Yes		Qualify
No		**Do not qualify**

What is you highest level of education?

	X	
Some primary schooling (have not completed grade 7)		**Do not qualify**
Completed grade 7		Qualify
Some secondary schooling (grade 8 – 11)		Qualify
Completed grade 12		Qualify
After school qualification (diploma/degree)		Qualify

Would you be interested in taking part in a focus-group discussion on this research topic at a later date?

Yes		No	

If yes, please provide your name and contact details: *(These details will only be used to contact you to make arrangements for the focus-group discussion. It will not be shared with anyone and will not be used for any other purpose)*

Name: _____Contact details: _____

To be completed after the survey by the interviewer:
(based on the question: "How often do you read the nutrition information on a food label")

Label reader *(if the participant answered Sometimes/Frequently/ Always)*		**Label non-reader** *(if the participant answered Seldom/Never)*	

Addendum C: Phase one consent form (English)

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM
Phase One: Interviewer-administered electronic survey

TITLE OF THE RESEARCH PROJECT:
The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

REFERENCE NUMBER:

PRINCIPAL INVESTIGATOR:
Nelene Koen

ADDRESS:
Faculty of Medicine and Health Sciences
Division of Human Nutrition
Stellenbosch University
Room 3088, Clinical Building
Francie van Zyl Drive
Tygerberg

CONTACT NUMBERS:
0219389256 / 0823718029

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researchers any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?
The aim of this study is to determine whether consumers read and understand food labels and in particular the nutrition information provided on a food label. It also aims to investigate the factors that influence the food that you buy. The information gathered from this study

can help to make useful recommendations to improve food labelling so that it may help consumers to make healthier food choices.

The study will be conducted at sixteen selected grocery stores in Cape Town. Nine hundred and sixty participants will be selected to take part in the survey, while 60 participants will be selected at this particular store.

Participants exiting a grocery store will be approached and asked to take part in the survey. If you agree to take part in the survey, the researcher will ask you some questions using an electronic device. He/she will complete the survey on the device. The survey will take approximately 15 – 20 minutes to complete. Questions about your food label knowledge, understanding and how you use the label will be asked as well as general questions about yourself.

Why have you been invited to participate?

You have been selected to take part in the study because you are a literate adult, responsible for the food shopping in your household.

What will your responsibilities be?

The only responsibility you have is to answer the survey questions.

Will you benefit from taking part in this research?

There is no direct benefit to you. The results of the study could help to gain a better understanding of how consumers read, understand and use food labels.

Are there any risks involved in your taking part in this research?

There are no risks involved with the participation in the study. All survey information will be treated as confidential and your participation is anonymous.

Who will have access to the survey information?

The information obtained from the anonymous (no name required) surveys will be treated as confidential and analysed for research purposes. Only the research team will have access to the information provided. Should you be willing to take part in a group discussion with a small group of people who also completed this survey (6 – 10 people) on the topic at a later stage, you will be requested to provide your contact details to the researcher at the end of the survey. This information will only be used for the purpose of organising the group discussion and your contact details will not be linked to your survey.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study but you will be compensated with a R50 food voucher for your time. There will be no costs involved for you, if you do take part.

Is there any thing else that you should know or do?

You can contact Mrs Nelene Koen, the principle investigator at 021 938 9256 or 082 371 8029 if you have any further queries or encounter any problems. You can also contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have

not been adequately addressed by the researcher. You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I …….. agree to take part in a research study entitled "The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) …….. 2016.

…… ……

Signature of participant **Signature of witness**

Declaration by investigator

I *(name)* …….. declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above

Signed at (*place*) ..... on (*date*) …….. 2016.

…… ……

Signature of investigator **Signature of witness**

Addendum D: Phase one interviewer-administered electronic survey

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

All information will be treated as confidential.
Please complete all questions and mark all boxes with an X (where applicable):

Section A: Demographic characteristics

1. Participant Code _____

2. Indicate the retailer where the participant was recruited:

	X
Checkers	
PicknPay	
Shoprite / USave	
Spar	
Woolworths	

3. Indicate the health district where the participant was recruited:

	X
Northern district	
Southern District	
Eastern district	
Western district	

4. How old are you? _____ years

5. Please indicate your gender:

	X
Female	
Male	

6. What is your marital status?

	X
Single	
In a relationship	
Engaged	
Married	
Divorced	
Widow / Widower	
Other, please specify:	

7. Do you have any children?

	X
Yes	
No	
If yes, how many children do you have? _____ child/ren	

8. How many adults live in your house? _____ adults

9. How many children (<18yrs of age) live in your house? _____children

10. What is your highest level of education?

	X
Completed grade 7	
Some secondary schooling (grade 8 – 11)	
Completed grade 12	
After school qualification (diploma/degree)	

11. What is your occupation? _____

12. Please indicate your total net household monthly income (after deductions on your payslip):

	X
No income	
R1 – R1600	
R1 601 – R3 200	
R3 201 – R6 400	
R6 401 – R12 800	
R12 801 – R25 600	
R25 601 – R51 200	
R51 201 – R102 400	
R102 401 or more	
I do not wish to tell you my income	
I do not know	

13. What is your ethnic origin?

	X
Black	
Coloured	
Asian	
White	
I do not wish to tell you my ethnic origin	
Other, please specify:	

14. How often do you shop for food?

	X
Daily	
Two to six times per week	
Weekly	
Monthly	

15. Do you do your grocery shopping at the same grocery store each time?

	X
Always	
Most of the time	
Sometimes	
Seldom	

16. Indicate the retailers where you normally shop for food: *(may tick more than one)*

	X
Checkers	
Eight till late	
Food Lovers Market	
Farmer's market	
OK	
PicknPay	
Seven Eleven	
Shoprite / USave	
Spar	
Spaza shops	
Woolworths	
Other?	

Section B: Lifestyle, behaviour and psycho-social factors

17. Do you follow a special diet, eat or limit certain foods for health reasons?

	X
Yes	
No	
If yes, please specify:	

18. Do you use any vitamin and/or mineral supplements?

	X
Yes	

No	

19. If you answered yes to question 18, please specify the name, dosage and frequency of use:

Name of supplement:	Dosage:	Frequency:

20. Do you suffer from any of the following chronic diseases for which you take medication? (*may tick more than one)*

	X
Hypertension	
Diabetes	
Heart disease	
High cholesterol	
Cancer	
Osteoporosis	
Other:	

21. Do you believe that the foods you eat have a direct impact on your health?

	X
Yes	
No	
Unsure	

Section C: Nutrition label reading and opinion

22. How often do you read the <u>nutrition information</u> on a food label? (this includes any information regarding the nutritional content of the food e.g. nutrition information table, list of ingredients, any nutrition or health claims, any health-endorsement logos etc.)

	X
Never/Seldom *(will skip question 24) Classify participant as a label non-reader on screening form)*	
Sometimes *(will skip question 23) Classify participant as a label reader on screening form)*	
Frequently/Always *(will skip question 23) Classify participant as a label reader on screening form)*	

23. If you answered "Never/Seldom" to question 22, please indicate why do you not read the nutrition information on food products: *(do not read options – interviewer tick appropriate boxes)*

	X
I buy the same type of products all the time	
I do not have time to read the label	
I always buy the cheapest product	
I always buy the same brand	
I am not interested in the nutritional information provided	
I do not understand or know how to interpret the information provided	
I did not know that there was nutrition information on food products	
I buy products without labels	
Other?	

24. If you answered sometimes or frequently/always to question 22, please indicate when you read the nutrition information on a food label? *(may tick more than one)*

	X
Before I go to the grocery store	
While in the grocery store	
At home after I purchased the product	
Just before I use the product	
Other?	

25. Please select the option that best describes you. I read the nutrition information provided on labels to: *(interviewer can show consumer the options if necessary. Can tick more than one box)*

	X
Determine the amount of a nutrient in a serving of food or % of NRV for a nutrient	
Compare nutrient contents in different brands of the same food	
Shop for foods for a special diet	
Plan meals	
Compare amounts of a nutrient in different foods	
I am not sure why I read it	
Other?	

26. How often do you specifically read the <u>nutrition information table</u> on a food label? *(show an example on the label)*

	X
Never/Seldom *(will skip question 27)*	

Sometimes	
Frequently/Always	

27. If you answered sometimes or frequently/always to question 26, please indicate which nutrients you look at in the nutrition information table? *(do not read options – interviewer tick appropriate boxes. May tick more than one)*

	X
Energy	
Protein	
Carbohydrates	
Sugar	
Total fat	
Saturated fat	
Dietary fibre	
Trans fat	
Sodium	
Cholesterol	
Omega 3	
Vitamins and minerals	
Other? Please specify	

28. If you look at vitamins and minerals, please indicate which vitamins or minerals you look for in the nutrition information table? *(do not read options – interviewer tick appropriate boxes. May tick more than one)*

	X
I do not look at vitamins and minerals	
Vitamin A	
Vitamin B1/Thiamin	
Vitamin B2/Riboflavin	
Nicotinic acid/ Nicotinamide/Niacin	
Vitamin B6 / Pyrodoxine	
Folic acid or Folate	
Vitamin B12 or Cyanocobalamin	
Biotin	
Pantothenic acid	
Vitamin C/Ascorbic acid	
Vitamin D	
Vitamin E	
Vitamin K	
Calcium	
Chromium	
Copper	
Iodine	

Magnesium	
Molybdenum	
Phosphorus	
Selenium	
Zinc	
Choline	
Combination of various vitamins and minerals	
Depends on the product	
Other?	

29. How often do you specifically read the list of ingredients on a food label when purchasing food products: *(show an example on the label)*

	X
Never/Seldom *(will skip question 30)*	
Sometimes	
Frequently/Always	

30. If you answered sometimes or frequently/ always to question 29, please indicate why you read the ingredient list:

	X
To avoid specific additives	
To avoid other specific ingredients	
To see which allergens the product contains	
To see which ingredients are present in the highest quantities	
To see how many ingredients the product contains	
To see what the composition of the product is	
Other?	

31. How often do you specifically read the nutrition and health claims on a food label when purchasing food products e.g. low in fat or high in fibre:

	X
Never/Seldom *(will skip question 32)*	
Sometimes	
Frequently/Always	

32. If you answered sometimes or frequently/always to question 31, please indicate which claims on a food label is important to you when purchasing food products? *(do not read options – interviewer tick appropriate boxes)*

	X
Energy claims e.g. “Low in Energy”	
Protein claims e.g. “High in Protein”	
“High in carbohydrates”	

Sugar claims e.g. “Sugar free”	
Fat claims e.g. “Low in total fat”	
Dietary fibre claims e.g. “Source of dietary fibre”	
Sodium e.g. “Low in Sodium”	
Cholesterol e.g. “Low in cholesterol”	
Vitamins e.g. “Source of vitamin C”	
Minerals e.g. “Source of calcium”	
Omega-3-fatty acids e.g. “Source of omega-3-fatty acids”	
Claims related to Glycaemic index (GI) and/or glycaemic load (GL)	
Claims for a nutrient which relates to a health function e.g. “Vitamin A is necessary for normal vision”	
Claims for a nutrient which relates to a disease function e.g. “Diets low in sodium may reduce the risk of blood pressure”	
Slimming claims	
Other?	

33. Please indicate the importance of nutrition information on labels when you <u>buy products for the first time</u>? (this includes any information regarding the nutritional content of the food e.g. nutrition information table, list of ingredients, any nutrition or health claims, any health-endorsement logos etc.)

	X
Important	
Neither important nor unimportant	
Unimportant	
It depends on the product	

34. Please indicate the importance of nutrition information when you <u>buy known brands</u>? (this includes any information regarding the nutritional content of the food e.g. nutrition information table, list of ingredients, any nutrition or health claims, any health-endorsement logos etc.)

	X
Important	
Neither important nor unimportant	
Unimportant	
It depends on the product	

35. Please indicate any <u>health-endorsement logos</u> on a food label that you will recognise, if any? *(show Whole wheat logo as an example on Weetbix box. Do not show any other examples on the box. Do not read options – interviewer tick appropriate boxes)*

	X
None *(will skip question 36)*	
CANSA Smart Choice Seal	

Heart mark	
Weigh-less	
GI	
Other?	

36. Please indicate the importance of these health-endorsement logos to you when purchasing a food product? *(tick not applicable if not listed in question 35)*

	Important	Unimportant	Depends on the product	Not applicable
CANSA Smart Choice Seal				
Heart mark				
Weigh-less				
GI				
Other?				

37. Would you buy a product based on the presence of a health-endorsement logo in comparison to a product without the same health-endorsement logo?

	X
Yes	
No	
Maybe	
It depends on the product	

38. Would you prefer one standard health-endorsement logo to be used on all foods considered to be healthy instead of having a variety of different logos on products?

	X
Yes	
No	
Maybe	

Section D: Factors that influence purchasing behaviour

39. Which of the following factors influence your purchasing of a food product?

	Yes	No	Sometimes
Price			
Nutrition information provided in the nutrition information table			

Ingredients			
Claims			
Health-endorsement logos			
Allergens			
Preservatives			
Serving size			
Total volume/grams			
Manufacturer or Brand			
Sell by/Best before date			
Type of packaging			
Specials/Promotions			
Environmentally friendly statements			
Recipes provided			
Preparation /cooking instruction			
Convenience			
Organic / Free range claims			
GMO related claims			
Other? Please specify			

Section E: Barriers and expectations

40. Please indicate whether you agree or disagree with the following statements regarding barriers to using food labels related to the food product:

	Agree	Disagree	Sometimes
I find it difficult to understand the nutrition information provided in the nutrition information table			
I find the information used in the ingredient list confusing			
I find it difficult to interpret the health and nutrition claims made on food labels			
I find it difficult to interpret the different health-endorsement logos used on food labels			
The font size is too small and difficult to read			
It is difficult to locate the specific nutritional information I am looking for			
I find it difficult reading understanding the language used on the food label			

41. Which of the following would help you to understand and interpret nutrition information on food products: (this includes any information regarding the nutritional content of the food e.g. nutrition information table, list of ingredients, any nutrition or health claims, any health-endorsement logos etc.)

	X
Use more pictures and colour	
Include more languages	
Use larger font size	
Use less complex terminology	
Use a standard health-endorsement logo for all healthy foods	
Other, please specify:	

42. Please describe any other expectations of what nutrition information you would like to be included on food labels.

Section F: Food label knowledge

A label of a 900g box of Weetbix must be given to the participant. The participant must be asked to answer questions or point to information on the product label:

Please look at the product provided and answer the following questions:

Locating certain information

43. How much saturated fat is in 100g of this food?

	X
0.3g	
Incorrect answer	
Do not know	

44. What is the main ingredient of this product?

	X
Whole wheat	
Incorrect answer	
Do not know	

45. Consumers with what type of intolerance/allergy should avoid this product?

	X
Wheat / gluten	
Incorrect answer	
Do not know	

Calculations based on provided product

46. If you ate 100g of this food, how much total sugar would you consume?

	X
1.8g	
Incorrect answer	
Do not know	

47. If you ate one serving of this food, how much dietary fibre would you consume?

	X
4.3g	
Incorrect answer	
Do not know	

48. How many servings of Weetbix can you get from this box?

	X
22.5/24	
Incorrect answer	
Do not know	

Nutrient content claims

49. Please identify the nutrient content claims made on this product?

	X
High in fibre	
Source of vitamin B1, B2 and Niacin	
Source of iron	
Do not know	
Other? Please specify	

50. Please identify the health-endorsement logos on this product?

	X
CANSA Smart Choice Seal	
Heart mark	
Do not know	
Other? Please specify	

Thank you very much for participating in the survey!

Addendum E: Phase one content validity - list of experts

Expert:	Qualifications and field of expertise:
Ms. Jane Badham	Registered Dietitian, Masters in Nutrition Food labelling regulations & industry
Ms. Karen Horsburg	Registered Dietitian Food labelling regulations
Ms. Megan Kluyts	Registered Dietitian, Masters in Nutrition Food labelling regulations & industry
Ms. Maritha Marais	Registered Dietitian, Masters in Nutrition Questionnaire development
Dr. Debora van der Merwe	PhD Food Sciences Food labelling regulations
Ms. Florette van Rooyen	B Food Sciences Food industry

Addendum F: Phase one pilot study participant feedback form

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

Please answer the following questions with regard to the electronic survey. Your feedback will be greatly appreciated and will assist in improving the survey. All information will be treated as confidential. Please complete all questions and mark all boxes with an X (where applicable):

1. Please indicate whether the length of the survey was:

	X
Too long	
Acceptable	

2. How long did it take to complete the survey? _____

3. Was the language used in the survey clear and easy to understand?

	X
Yes	
No	
Some questions were unclear	

If you answered "No" or "Some questions were unclear" to question 3, please indicate which questions were unclear:

Section A: Demographic characteristics questions

	X
All questions were clear	
Please indicate which questions were unclear and why:	

Section B: Lifestyle, behaviour and psycho-social questions

	X
All questions were clear	
Please indicate which questions were unclear and why:	

Section C: Use and opinion questions

	X
All questions were clear	
Please indicate which questions were unclear and why:	

Section D: Knowledge questions

	X
All questions were clear	
Please indicate which questions were unclear and why:	

Section E: Factors that influence purchasing behaviour questions

	X
All questions were clear	
Please indicate which questions were unclear and why:	

Section F: Barriers and expectations questions

	X
All questions were clear	
Please indicate which questions were unclear and why:	

Do you have any other, general comments about the survey?

Thank you very much for your time

Addendum G: Phase one food voucher register

Phase One: The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa

FOOD VOUCHERS REGISTER

Research Assistant name: _____

	Date:	Location:	Voucher number:	Signature Researcher:	Participant Code:	Signature Participant:
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

To be submitted to Nelene Koen after every week of data collection

Addendum H: Phase two consent form (English)

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM
Phase two: Focus-group Discussions

TITLE OF THE RESEARCH PROJECT:
The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

REFERENCE NUMBER:

PRINCIPAL INVESTIGATOR:
Nelene Koen

ADDRESS:
Faculty of Medicine and Health Sciences
Division of Human Nutrition
Stellenbosch University
Room 3088, Clinical Building
Francie van Zyl Drive
Tygerberg

CONTACT NUMBERS:
0219389256 / 0823718029

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researchers any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?
The aim of this study is to determine whether consumers read and understand food labels and in particular the nutrition information provided on a food label. It also aims to investigate the factors that influence the food that you buy. The information gathered from this study

can help to make useful recommendations to improve food labelling so that it may help consumers to make healthier food choices.

The researchers would like you to take part in a group discussion with other consumers to discuss these issues. A total of eight focus-group discussions will be held with consumers from Cape Town. There will be approximately six to ten participants in each discussion group and it will be conducted at a convenient location that was pre-arranged with you. The researcher will ask you some questions on the topic and document your responses. Your identity will remain anonymous and the focus-group discussions will be tape-recorded.

Why have you been invited to participate?

You have been selected to take part in the study because you are a literate adult, responsible for the food shopping in your household. You either responded to an invitation on social media to take part in a focus-group discussion on food labelling or you took part in a survey which was the first phase of this study. At the end of the survey, you indicated that you are willing to take part in a focus-group discussion to further explore issues on this topic.

What will your responsibilities be?

Your only responsibility will be to set aside some time to take part in the discussion. First, you will be required to complete a short questionnaire about yourself. This will take approximately 5 minutes. The researcher will then start with the focus-groups discussion. In total, the questionnaire and focus-group discussion will take approximately 90 minutes. Your permission is also required for the focus-group discussion to be tape-recorded. The recording will be transcribed and the information gathered will be analysed. No identifying information will be recorded on the transcription.

You will be expected to travel to and from the venue for the focus-group discussion.

Will you benefit from taking part in this research?

There is no direct benefit to you. The results of the study could help to gain a better understanding of how consumers read, understand and use food labels.

Are there any risks involved in your taking part in this research?

There are no risks involved with the participation in the study. All information gathered during the focus-group discussion will be treated as confidential and your participation is anonymous.

Who will have access to the information?

The information obtained from the focus-group discussions will be treated as confidential and analysed for research purposes. Only the research team will have access to the information provided.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study but you will be compensated with a R150 voucher for your transport and time. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact Mrs Nelene Koen, the principle investigator at 021 938 9256 or 082 371 8029 if you have any further queries or encounter any problems. You can also contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by the researcher. You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I …….. agree to take part in a research study entitled "The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) …….. 2016.

....

Signature of participant **Signature of witness**

Informed consent for taping of the interview

I understand that the focus-group discussion will be voice recorded to enable the researcher to accurately transcribe the discussion. It has been explained to me that the recordings and all electronic documents will be stored safely and destroyed after six months of completion of the research. I was given the opportunity to ask questions and all queries were explained to my satisfaction. I have been given a copy of the consent form.

Signed at (*place*) ..... on (*date*) …….. 2016.

.....	.....
Signature of participant	**Signature of witness**

Declaration by investigator

I *(name)* …… declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use a interpreter. (*If a interpreter is used then the interpreter must sign the declaration below.*

Signed at (*place*) ..... on (*date*) …….. 2016.

.....	.....
Signature of investigator	**Signature of witness**

Addendum I: Phase two and three demographic questionnaire

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

Participant code: ☐

All information will be treated as confidential. / *Alle informasie sal konfidensieel hanteer word.*

Please complete all questions and mark all boxes with an X (where applicable): / *Voltooi asseblief alle vrae en merk die boksies met 'n X (waar toepaslik):*

Demographic characteristics / *Demografiese eienskappe*

51. Focus-group venue / *Fokusgroep ligging:* _____

52. How old are you? / *Hoe oud is jy?* _____ years / *jare*

53. Please indicate your gender: / *Dui asb jou geslag aan:*

	X
Female / *Vroulik*	
Male / *Manlik*	

54. What is your marital status? / *Wat is jou huwelikstatus?*

	X
Single / *Enkel*	
In a relationship / *In 'n verhouding*	
Engaged / *Verloof*	
Married / *Getroud*	
Divorced / *Geskei*	
Widow or widower / *Weduwee of wewenaar*	
Other, please specify: / *Ander, spesifiseer asb:*	

55. Do you have any children? *Het jy enige kinders?*

	X
Yes / *Ja*	
No / *Nee*	

Please complete questions 6 if you answered "yes" to question 5: / *Voltooi asseblief vraag 6 indien jy "ja" geantwoord het op vraag 5:*

56. How many children do you have / *Hoeveel kinders het jy*? _____ child/ren / *kind/ers*

57. How many people live in your house / *Hoeveel mense woon in jou huis*? _____ people / *mense*

58. What is your highest level of education / *Wat is jou hoogste vlak van opvoeding*?

	X
Completed grade 7 / *Het graad 7 voltooi*	
Some secondary schooling (grade 8 – 11) / *Gedeeltelike sekondêre onderrig (graad 8 – 11)*	
Completed grade 12 / *Het graad 12 voltooi*	
After school qualification (diploma/degree) / *Na skool kwalifikasie (diploma/graad)*	

59. What is your occupation / *Wat is jou beroep*?

_____

60. Please indicate your total household monthly income (after deductions): / *Dui asb jou totale huishoudelike inkomste aan (na aftrekkings):*

	X
No income / *Geen inkomste*	
R1 – R1600	
R1 601 – R3 200	
R3 201 – R6 400	
R6 401 – R12 800	
R12 801 – R25 600	
R25 601 – R51 200	
R51 201 – R102 400	
R102 401 or more	
I do not wish to tell you my income / *Ek wil nie vir jou my inkomste vertel nie*	
I do not know / *Ek weet nie*	

61. What is your ethnic origin / Wat is jou etniese oorsprong?

	X
Black / *Swart*	
Coloured / *Kleurling*	
Asian / Asiër	
White / Wit	
I do not wish to tell you my ethnic origin / *Ek wil nie vir jou my etniese oorsprong vertel nie*	
Other, please specify: / *Ander, spesifiseer asb:*	

62. What is your home language? / *Wat is jou huistaal?*

	X
Afrikaans	
English / *Engels*	
isiXhosa	
Other, please specify: / *Ander, spesifiseer asb:*	

Please hand in to the researcher / *Handig asb in vir die navorser*

Addendum J: Phase two discussion guide - nutrition information readers

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

General procedure prior to focus-group discussion

1. Refreshments to be served at arrival
2. Greet participants and introduce yourself (Nelene/Marzanne) and Sonja.
3. Explain the role of the facilitator (Nelene/Marzanne) and the observer (Sonja).
4. Give a brief description of the purpose of the research study.
5. Obtain written, informed consent from all participants as well as consent to tape record the discussion.
6. Participants complete the self-administered demographic questionnaire.
7. Start with explaining how the focus-group will work

Focus-group discussion

- Set the ground rules for the focus-group discussion
- Participants will be asked a series of questions of which there is no right or wrong answer.
- Everyone must feel free to participate.
- The facilitator will guide the discussion and may ask participants to move on to keep within the time limit (of 90 minutes).
- Only one person to speak at a time in order to document responses correctly.
- Although the discussion will be recorded, all names will be removed from the recording.
- Give participants the opportunity to ask questions.

Focus-group discussion start

We will now start with the discussion. We will start the recording now. START RECORDING

Theme 1: Labelling factors that will influence purchasing behaviour (approximately 20 minutes)

1. Please tell me a little bit more about how and when you generally shop for food?
2. I would like you to think about when you go to do your grocery shopping. Please explain to me what factors, in general, determine what products you buy?
   (prompts: price, family, convenience, meal plan for the week, what you feel like at that moment)
3. Now I would like you to think about the food product itself. Can you tell me whether there is anything about the food product, indicated on the label specifically, that will make you buy that specific product?
   (prompts: the "look" of the product", ingredients, claims, symbols, nutritional content, best before, manufacturer, brand, recipes, country of origin, preparation and storage, size)

Theme 2: Effective nutrition labelling techniques and consumer expectation (approximately 20 minutes)

Show various examples of different food labels

1. Please study the labels presented here. Which one of these labels stands out to you and for what reasons?
   (prompts: packaging, pictures, nutrition information, claims, brand, symbols)
2. I would like to know more about the different ways in which nutrition information are displayed on these various labels. I would really appreciate your opinion on which format you would prefer? Please tell me why you prefer this specific format?
3. Now I would like to talk more about your expectations when it comes to food labels. What information would you like to see on a food label? How would you like this information to be displayed to make it more user-friendly?

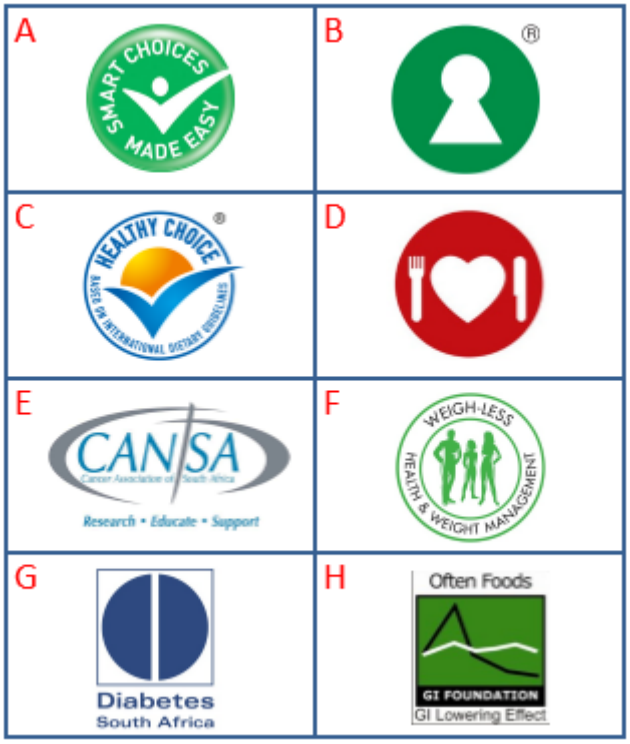
Theme 3: Interpretation/Understanding of food labels (approximately 20 minutes)

1. You have all indicated that you read the nutrition information on food labels. Tell me about what you understand when we talk about "nutrition information" on food labels?
   (prompts: list of ingredients, nutrition information table, nutrition and health claims, health symbols)
2. I would like to hear more about why the nutrition information on food labels is important to you?
3. Can you give me examples of the type of nutrition information you read on food labels and why this is important to you?
4. Can you provide me with examples of how you use this information and whether it influences your decision on whether to buy the product or not?
5.

Theme 4: The use of logos in nutrition labelling (approximately 30 minutes)

Hand out examples of logos (laminated page)

1. If you would to see this symbol on a product, what would the presence of such a logo mean to you?
2. I would like us to discuss the use of symbols on nutrition labels. Please tell me, in general, how you feel about these types of symbols on food products?
3. Explain to me how you would feel if we had a general healthy food symbol like this in South Africa indicating whether a food is a healthier option or not.
4. Would a symbol like this influence whether you buy a product over a similar product?
5. Please tell me which of these symbols on the laminated page do you like and why you like that particular symbol? (discuss each symbol individually)
6. I would appreciate it if you can tell me what you think about the design of each symbol?
   (prompts: colours, overall design of the logo, whether the logo is attractive)



Thank you very much for taking part in this focus-group discussion. Your input is very valuable to us and we appreciate you taking the time to take part.

Addendum K: Phase two discussion guide- nutrition information non-readers

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

General procedure prior to focus-group discussion

8. Refreshments to be served at arrival
9. Greet participants and introduce yourself (Nelene/Marzanne) and Sonja.
10. Explain the role of the facilitator (Nelene/Marzanne) and the observer (Sonja).
11. Give a brief description of the purpose of the research study.
12. Obtain written, informed consent from all participants as well as consent to tape record the discussion.
13. Participants complete the self-administered demographic questionnaire.
14. Start with explaining how the focus-group will work

Focus-group discussion

- Set the ground rules for the focus-group discussion
- Participants will be asked a series of questions of which there is no right or wrong answer.
- Everyone must feel free to participate.
- The facilitator will guide the discussion and may ask participants to move on to keep within the time limit (of 90 minutes).
- Only one person to speak at a time in order to document responses correctly.
- Although the discussion will be recorded, all names will be removed from the recording.
- Give participants the opportunity to ask questions.

Focus-group discussion start

We will now start with the discussion. We will start the recording now. START RECORDING

Theme 1: Self-reported labelling factors that will influence purchasing behaviour (approximately 20 minutes)

1. Please tell me a little bit more about how and when you generally shop for food?
2. I would like you to think about when you go to do your grocery shopping. Please explain to me what factors, in general, determine what products you buy?
   (prompts: price, family, convenience, meal plan for the week, shopping list, what you feel like at that moment)
3. Now I would like you to think about the food product itself. Can you tell me whether there is anything about the food product, indicated on the label specifically, that will make you buy that specific product?
   (prompts: the "look" of the product best before date, manufacturer, brand, recipes, country of origin, preparation and storage, size, any nutrition information)

Theme 2: Self-reported reasons for label non-use (approximately 30 minutes)

1. You have all indicated that you do not read nutrition information provided on the food label often. I would like us to talk more about why you do not always read this information.
   (prompts: price, time, not interested, understanding of the information provided, only interested in taste or known brands)

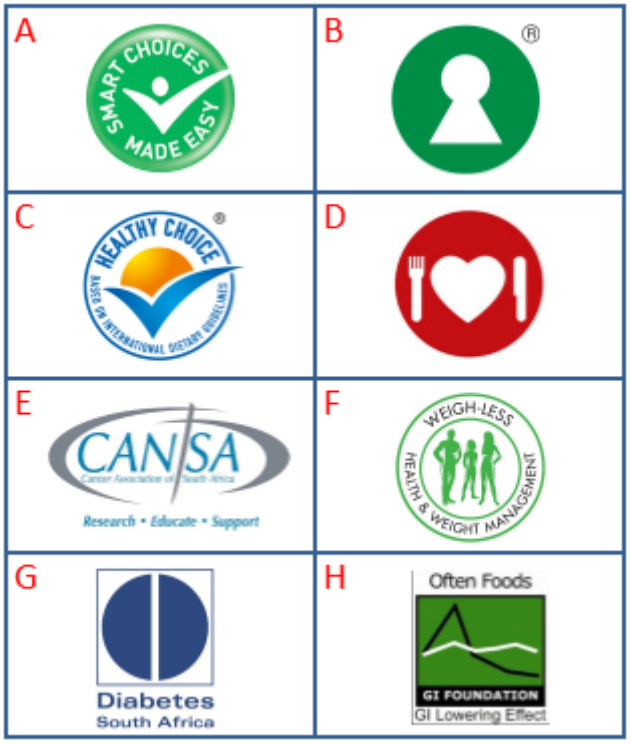
Show examples of food labels

2. If we think about the different nutrition information provided on a food label such as the nutrition information table, list of ingredients, claims and symbols such as the heart mark or the weigh less mark – would you like any of this information to be presented in another way, or would it not make any difference to you. Let's talk about what changes can be made to the format in which this information is provided.
   (prompts: simpler language, less information, more front-of-pack labelling, more pictures and colours)

Theme 3: The self-reported use of logos in nutrition labelling (approximately 30 minutes)

Hand out laminated examples of logos

1. If you would to see these symbols on a product, what would the presence of these logos mean to you?
2. I would like us to discuss the use of symbols on nutrition labels. Please tell me, in general, how you feel about these types of symbols on food products?
3. Explain to me how you would feel if we had a general healthy food symbol like this in South Africa indicating whether a food is a healthier option or not.
4. Would a symbol like this influence whether you buy a product over a similar product?
5. Please tell me which of these symbols on the laminated page do you like and why you like that particular symbol? (discuss each one)
6. I would appreciate it if you can tell me what you think about the design of each symbol? (discuss each one)
   (prompts: colours, overall design of the logo, whether the logo is attractive, what does it symbolise e.g the heart, the tick etc)



Thank you very much for taking part in this focus-group discussion. Your input is very valuable to us and we appreciate you taking the time to take part.

Addendum L: Phase two food voucher register

Phase two: The influence of Nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa

FOCUS-GROUP DISCUSSIONS: VOUCHER/CASH REGISTER

Researcher / RA name: _____

Date: _____ Location: _____

	Voucher Value:	Signature Researcher:	Participant Code:	Signature Participant:
1	R150			
2	R150			
3	R150			
4	R150			
5	R150			
6	R150			
7	R150			
8	R150			
9	R150			
10	R150			

TOTAL: _____

Addendum M: Summary of phase two FGDs for graphic design company

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa"

Nelene Koen

Brief summary of information pertaining to health-endorsement logos (HEL): Phase two focus-group discussions

Focus-group participants

Focus-group participants consisted of adult, literate (≥Grade 7) consumers, representative of Cape Town. Nine focus-group discussions were held over a two month period at various locations.

General comments

In general, consumers who participated in the focus-group discussions were very positive about the idea of a single health-endorsement logo for healthy food products. Some of the reasons given included:

It will make it less confusing for them

Consumers do not understand the different logos

It will make the process of choosing a healthier food product less time consuming and more convenient

Concerns that were raised:

An education campaign should accompany the launch of such a logo to inform consumers of the logo and the meaning thereof.

According to consumers, products containing health-endorsement logos are generally more expensive.

General comments received regarding the overall design of HEL

It was clear from the focus-group discussions that consumers would prefer a simple, clear, easy to understand logo. The majority indicated that the logo should include wording related to health/healthy choice/better choice etc. Pictures/symbols used should relate directly to health, a healthy lifestyle, a better choice etc.

Other comments included:

If wording is included, it should be in a large font and easy to read

Wording should be in English

Colours must be bold and stand out. Green, Blue, Orange and Red are all preferred colours. Dull and neon colours were disliked by many.

International: United States Smart Choices (A) comments

Positive comments	Negative comments
• Simple design • Includes clear wording • Capital letters – easy to read • Likes the tick – symbolises the right choice, the better choice • Many liked the green. Some indicated that the green symbolises "health" or "growth"	• Smart Choice does not relate directly to health – smart choice could mean "cheaper option"; "something to do with intelligence" • Some did not like the green • Does not stand out • Too plain
Other comments	
"Looks like a person standing with his arms open. The person looks happy"	

International: Swedish Keyhole (B) comments

Positive comments	Negative comments
• Simple	• Majority of consumers did not understand the logo • Many could not link the keyhole to a healthier choice or health in general • Some thought the symbol resembled the female sign used on bathroom doors

Other comments
"it does not look healthy to me" "It says nothing. Only a key holder?" "I will not notice it. It means nothing to me"

International: Netherlands Healthy Choices (C) comments

Positive comments	Negative comments
• Majority of the feedback was positive. Of all the logos discussed, many preferred this logo. • Clear link to health • Happy, bright colours • Likes the tick • Likes the idea of the sun coming up – resembles a new day or new beginning • Wording is clear, simple and relates directly to health. • Many indicated that they like the wording: Healthy Choice	• Some indicated that they would have preferred the blue to be green • "Based on international dietary guidelines" confused some consumers. One asked whether this implies that the product is an international product. • Too much writing included on the logo
Other comments	
"it shows that it is good for your health and it is bright orange and blue. The orange looks like the sun and the sun is good for your health"	

National: SA Heart and Stroke Foundation logo (D) comments

Positive comments	Negative comments
• Majority of the feedback was positive. Of all the logos discussed, many also preferred this logo. • Very positive association with this logo • Familiar and well-known logo • Colour and symbol of love – symbolises caring for yourself and your family • Knife and fork – clear link to food • Simple and eye-catching	• Not all made the association with heart health. • Some indicated that they would prefer some wording with the logo
Other comments	
"it actually tells me to not be afraid. You can buy this product, you are doing the right thing"	

National: CANSA logo (E) comments

Positive comments	Negative comments
• Majority indicated that this logo symbolises health • Associated with safe products • Products with this logo can be trusted	• Colours are dull • Not eye-catching • Some did not understand the purpose of the line between CAN and SA • Not a clear understanding of the logo: Some thought that products with this logo are specifically for people with cancer, while others commented that if a product does not contain this logo, whether the product will then cause cancer • "Smart choice" not a clear link with health • Too busy

Other comments
"This is for people with cancer" "if you buy products with this logo, then you donate money to cancer research" "The logo must be pink – the colour of cancer"

National: SA Weigh-Less logo (F) comments

Positive comments	Negative comments
• Familiar and well-known logo • The people in the logo show that it is suitable for the whole family • Likes the wording and that it specifically says "Health and Weight management" • Wording is clear and in bold • Green associated with health	• Too busy • Colours dull • This logo specifically is associated with more expensive products

Other comments
"this is for people who want to lose weight or not pick up weight" "not for everyone" "the people in the logo are slim like I want to be"

National: Diabetes SA (G) comments

Positive comments	Negative comments
• Consumers indicated this is an "important" logo although not well known • The word "Diabetes" is clear and in bold • It clearly says "South Africa"	• Dull colour • Boring logo • The majority of consumers did not like the design of this logo. The meaning of the symbol is unclear as many indicated it look like something is "broken" • Many have never seen the logo before • Consumers were worried that if a product does not contain this logo on the packaging, whether a diabetic should rather avoid it

Other comments
"does this mean the product is suitable for diabetics" "looks like a tablet cut in half"

GI Foundation South Africa (H) comments

Positive comments	Negative comments
• Those that were familiar with the logo had a positive association with the logo • Some said products containing this logo are healthier products • Some liked all the information provided	• Majority did not know the logo • Majority did not understand the logo • Too busy and too much information • Did not understand the word GI • Green colour too dark • Different types of font used • Not all understood what "often foods" referred to • Some said it looks like a heart monitor

Other comments
"this logo looks like grass" "product for diabetics"

Addendum N: Phase three list of experts

Expert:	Employment sector:
Ms. Antoinette Booysen	Department of Health
Ms. Linda Drummond	Consumer Goods Council
Mr. Owen Frisby	South African Association for Food Science and Technology (SAAFOST) Executive Director
Ms. Berna Harmse	Private practicing dietitian
Ms. Karen Horsburg	Food and Allergy Consulting and Testing Services (FACTS)
Ms. Megan Kluyts	Industry
Ms. Maritha Marais	Academia
Ms. Yvonne Rammbwa	Private practicing dietitian
Mr. Alpha Rasekhala	Industry, Association of Dietetics SA (ADSA)
Prof. Gunner Sigge	Academia
Dr. Harris Steinman	Food and Allergy Consulting and Testing Services (FACTS)
Mr. Nigel Sunley	Consultant
Ms. Bianca Swanepoel	Academia
Mr. Gilbert Tshitaudzi	Department of Health
Dr. Debora van der Merwe	Food and Allergy Consulting and Testing Services (FACTS)
Dr. Averalda van Graan	Medical Research Council
Ms. Florette van Rooyen	Food industry
Dr. Hanlie van Staden	Academia
Dr. Mariaan Wicks	Academia

Addendum O: Phase three Confidentiality agreement

Confidentiality Agreement

It is understood and agreed to that the design of the ten health-endorsement logos provided to me as a member of a group of experts in the fields of nutrition, food science and food labelling for the PhD research project titled "The influence of nutrition labelling and logos on consumer purchasing behaviour in Cape Town, Western Cape, South Africa", must be kept confidential. To ensure the protection of these designs it is agreed that:

I will not disclose the designs to anyone until the researcher gives me permission to do so.

I acknowledge that I have read and understand this agreement and voluntarily accept the duties and obligations set forth herein.

Recipient of confidential logo designs:

Name and Surname:

Signature:

Date:

Addendum P: Logo designs (Round one)

Logo A	Logo B	Logo C	Logo D	Logo E
Logo F	Logo G	Logo H	Logo I	Logo J

Addendum Q: Scoring sheet (Round one)

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."
Nelene Koen
PHASE THREE: Experts ROUND ONE

BACKGROUND INFORMATION:
Please familiarise yourself with the aims and objectives of this phase of the research study in the "Protocol Synopsis" before commencing with the first round.

In Round one you will be required to arrange the 10 health-endorsement logos according to the following factors:

OVERALL DESIGN of the logo
Taking into consideration all design aspects including aesthetics (use of colours, symbols, typography) and functionality of the logo

CONSUMER UNDERSTANDING of the logo
Whether literate consumers (≥Grade 7) will understand the meaning of the logo

USE OF COLOURS in the logo
Specifically focusing on the colours used in the logo design

USE OF SYMBOLS AND/OR WORDING in the logo
Specifically focusing on the symbols and wording used in the logo design

You will also be given the opportunity to make recommendations to the graphic designers to improve on these factors for all logos, taking into consideration the comments received from literate consumers, representative of Cape Town, regarding their preferences for a single health-endorsement logo for healthy food products using the SA Nutrient profile model as screening criteria.

After Round one, the three logos with the lowest combined score will be eliminated. Comments/recommendations from round one on the remaining 7 logos will be given to the graphic designers to make changes to the logos where possible and if it does not contradict comments received by consumers during the phase two focus-group discussions.

In Round two, you will be required to arrange the 7 remaining health-endorsement logos according to the same factors evaluated in round one. The two logos with the lowest combined score will be eliminated after round two. Comments/recommendations from round two on the remaining 5 logos will be given to the graphic designers to make final changes to the logos. These 5 logos will then be tested for acceptability; preference and understanding on literate consumers in focus-group discussions (FGDs) representative of the Cape Town. Based on the content analysis of the FGDs, the researcher will identify the logos that received the best feedback in terms of all the criteria. The health-endorsement logos, with a summary of the findings from phase three, will be submitted to the Department of Health. Further testing should then be done to determine the acceptability of these logos for

consumers in the different provinces of South Africa including different cultures, ethnic groups as well as illiterate consumers. However, this is outside the scope of this PhD.

Please arrange the 10 health-endorsement logos (A – J) in terms of

OVERALL DESIGN by using the following scale:

10 = **BEST** Overall design

1 = **WORST** Overall design

(The 10 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 10 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

Taking into consideration the comments received from consumers regarding their preferences for the overall design of health-endorsement logos, do you have recommendation for the graphic designer to improve on the *overall design* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Please arrange the 10 health-endorsement logos (A – J) in terms of

CONSUMER (literate) UNDERSTANDING by using the following scale:

10 = **BEST** Consumer understanding

1 = **WORST** Consumer understanding

(The 10 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 10 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

Taking into consideration the comments received from consumers regarding their preferences for the design of health-endorsement logos, do you have recommendation for the graphic designer to improve the *understanding* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Please arrange the 10 health-endorsement logos (A – J) in terms of the

USE OF COLOURS by using the following scale:

10 = **BEST** use of colours

1 = **WORST** use of colours

(The 10 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 10 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

Taking into consideration the comments received from consumers regarding their preferences for the design of health-endorsement logos, do you have recommendation for the graphic designer to improve the *use of colours* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Please arrange the 10 health-endorsement logos (A – J) in terms of the

USE OF SYMBOLS AND/OR WORDING by using the following scale:

10 = **BEST** Use of symbols and/or wording

1 = **WORST** Use of symbols and/or wording

(The 10 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 10 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	

Taking into consideration the comments received from consumers regarding their preferences for the design of health-endorsement logos, do you have recommendation for the graphic designer to improve the *use of symbols and/or wording* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Addendum R: Summary of round one comments from the experts

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa"

Nelene Koen

Summary of Expert feedback on

Round one Health-endorsement logos

Option / Logo A:

Final score received: 5.76/10

Overall design comments:
Design looks agricultural. Simple and easy to understand. Maybe change the the plant to something that relates more to health like a knife and fork or a heart. Nice and simple.
Comments on understanding of the logo:
Link to nutrition and health not that clear.
Comments on use of colours:
Needs contrasting colour – maybe blue or red? The green alone is too agricultural.
Comments on use of wording and/or symbols:
I like the wording "Better Choice" or "Good for you" or "More healthy for you"

Option / Logo B:

Final score received: 6.32/10

Overall design comments:
Design looks agricultural – perhaps the green could be more like a "tick" or change to blue.
Comments on understanding of the logo:
Connection with nutrition and health not that clear.
Comments on use of colours:
Shade the orange to represent the sun better. Orange to be brighter. Can be improved with a blue sky.
Comments on use of wording and/or symbols:
Change wording to "Better choice for a healthy life". Make the green lines look more like a "tick".

Option / Logo C:

Final score received: 6.76/10

Overall design comments:
I like the concept of this logo but the heart may imply that it is specifically for heart health. I like this design, good colours, wording not too much but enough to get the message across. I would just suggest "stretching" the words over the green arch so that the letters are slightly bigger and more visible. Gives the correct message but is not sufficiently visible. This logo would be more acceptable if the red heart and half green circle inside the outer circle is replaced with the full logo J, maybe in yellow with a green leaf. Better choice should be replaced with healthy choice.
Comments on understanding of the logo:
Symbolism of the red dots in the outer circle and the semi-circle in the middle is not clearly linked to health. Also, the semi-circle in the middle resembles the logo for Halaal food in a way. I prefer this option as it states clearly Better Choice = Healthy life.
Comments on use of colours:
I like the contrast of the colours. Suggest maybe blue and red. Green maybe not as striking. White wording on the light green background not very clear.
Comments on use of wording and/or symbols:
Use a larger font, it will be illegible on small scale. The heart may imply that it is good for the heart only – I would prefer a more generic symbol. The heart makes me think of the heart foundation symbol.

Option / Logo D:

Final score received: 2.03/10

This logo has been eliminated and will not be assessed further in Round two. Therefore no re-design required.

Overall design comments:
Does not relate to health for me at all. Meaning not clear at all.
Comments on understanding of the logo:
Don't mean much without words. Add a health message.
Comments on use of colours:
Colours too dull – not striking enough. Too much overlapping of colours.
Comments on use of wording and/or symbols:
Add text. No wording will lead to confusion. The symbol seems to represent environmental issues rather than health. Connection with nutrition and health not that clear.

Option / Logo E:

Final score received: 6.65/10

Overall design comments:
The word health somewhere in the logo would help.
Comments on understanding of the logo:
"Best" may be misleading.
Comments on use of colours:
Needs some red – possibly a heart on person. Has a nice mixture of blue and green. Options with green as the dominant colour in may opinion are the best. Change yellow colour to orange.
Comments on use of wording and/or symbols:
The green could resemble more of a "tick". Would change the wording to "Better choice" OR Maybe change wording to "Best choice for your health".

Option / Logo F:

Final score received: 4.92/10

Overall design comments:
Change to "Healthy Choice". The word health on its own doesn't mean much.
Comments on understanding of the logo:
The word health on its own doesn't mean much.
Comments on use of colours:
Use more yellow for bigger contract. When the logo is used on small scale the yellow will hardly be noticeable. Needs some red. Too dull. Not striking enough.
Comments on use of wording and/or symbols:
Symbol not clear; not sure if it signify hands or flames; doesn't link to health. Maybe make overall shape resemble a heart. Connection with nutrition and health not that clear. Seems more medical and caring. Not necessarily relating to nutrition.

Option / Logo G:

Final score received: 6.86/10

Overall design comments:
Wording in bolder font and Healthy spelt correctly. Good design. The combination of the tick plus person imply the message the best. The wording complements the logo well. I like this logo. Perhaps play around with the colours.

This logo has potential. The blue circle could be replaced with a plate with a spoon and fork on both sides and the wording and tick should be green. Currently too much blue in this picture.
Comments on understanding of the logo:
Comments on use of colours:
Could have some yellow. What about a green tick, rather than red? Green always seems to have a more positive connection than red. The colour of the wording on this logo does not stand out. Wording font size maybe a bit too small.
Comments on use of wording and/or symbols:
Change the font type to a simple style and enlarge the font size. Bolder font and correct spelling. Needs something to depict food or nature. Spoilt by ghostly figure. Rather use “Healthier choice” than “Healthy choice”. Do not say “The” healthy choice – rather just “Healthier choice”. Or “More healthy for you”

Option / Logo H:

Final score received: 7.87/10

Overall design comments:
I like the tick. The font should change. I like the wording “Healthy Choice”. Good design. The combination of the tick plus apple imply the message the best. The wording complements the logo well. Make it slightly more “compact”….seems like the words and the apple is on one side and the tick on the other side. The tick and the wording should be in the right proportion. They don’t seem to be “talking to each other”. The size of this logo needs to be reduced to be in the right proportion as depicted in Option G.
Comments on understanding of the logo:
Is an apple the right symbol to use to symbolise health?
Comments on use of colours:
Colours are awesome. I like the contrast of the colours. Text could be blue.
Comments on use of wording and/or symbols:
Change the font type to a simple style such as arial or calibri. Use a more modern font. Apple symbols are over-used and overrated. Change the symbol to something more original.

Rather say “healthier choice” than “healthy choice”. Replace the bitten apple with a whole apple. Looks too much like the Apple Computer logo. The bitten apple of this logo should be replaced with the full apple logo with fork and spoon from logo J.

Option / Logo I:

Final score received: 4.1/10

This logo has been eliminated and will not be assessed further in Round two. Therefore no re-design required.

Overall design comments:
Unclear.
Comments on understanding of the logo:
Many will not understand the word “endorsement”.
Comments on use of colours:
The dark green does not work in I. Too much overlapping of colours.
Comments on use of wording and/or symbols:
The symbol is not clearly associated with health and the word “endorsement” should be simplified. Connection with nutrition and health not that clear. Symbols does not make sense. Should use different wording. Use one symbol instead of two. This logo will be acceptable when the picture inside the circle is replaced with the full option of Option J in green.

Option / Logo J:

Final score received: 3.68/10

This logo has been eliminated and will not be assessed further in Round two. Therefore no re-design required.

Overall design comments:
My opinion of this logo may improve if there were wording included and perhaps a combination of 2 colours. This logo can be improved by changing the colour to blue or green and adding the words “healthy” or “healthy choice” or “best choice”
Comments on understanding of the logo:
Symbol may not be well understood without wording.
Comments on use of colours:
Red is habitually associated with danger, thus a plain red logo might be perceived to signify food to avoid. Needs contrasting colours for it to work. Red in my opinion is not a good colour for this logo as it is associated with the heart mark and heart health specifically.

This may be a good logo if presented in blue or green and wording is added.
Comments on use of wording and/or symbols:
Need wording – Add better / healthy choice somewhere This symbol is my preferred choice but the colour needs to be changed and wording should be added.

Addendum S: Logo designs (Round two)

 Logo A	 Logo B	 Logo C	 Logo D	 Logo E
 Logo F	 Logo G			

Addendum T: Scoring sheet (Round two)

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."
Nelene Koen
PHASE THREE: Experts ROUND TWO

BACKGROUND INFORMATION:
Thank you for your scoring and feedback given on the 10 health-endorsement logos in Round one. The three lowest scoring logos were eliminated. The designs of the remaining 7 logos were adapted by the graphic design company based on a summary of your comments. The summary consisted of all comments received by all experts. The design company was requested to improve the designs of the logos if possible and if it did not contradict comments received by consumers during the phase two focus-group discussions.

In Round two you are now once again required to arrange the remaining 7 health-endorsement logos according to the following factors:

OVERALL DESIGN of the logo
Taking into consideration all design aspects including aesthetics (use of colours, symbols, typography) and functionality of the logo
CONSUMER UNDERSTANDING of the logo
Whether literate consumers (≥Grade 7) will understand the meaning of the logo
USE OF COLOURS in the logo
Specifically focusing on the colours used in the logo design
USE OF SYMBOLS AND/OR WORDING in the logo
Specifically focusing on the symbols and wording used in the logo design

You also have a final opportunity to make recommendations to the graphic designers to improve on these factors for all seven logos, taking into consideration the comments received from literate consumers, representative of Cape Town, regarding their preferences for a single health-endorsement logo for healthy food products using the SA Nutrient profile model as screening criteria.

After round two, another two logos will be eliminated. Comments/recommendations from round two on the remaining 5 logos will be given to the graphic designers to make final changes to the logos. These 5 logos will then be tested for acceptability; preference and understanding on literate consumers in focus-group discussions (FGDs) representative of Cape Town. Based on the content analysis of the FGDs, the researcher will identify the logos that received the best feedback in terms of all the criteria. The health-endorsement logos, with a summary of the findings from phase three, will be submitted to the Department of Health. Further testing should then be done to determine the acceptability of these logos for consumers in the different provinces of South Africa including different cultures, ethnic groups as well as illiterate consumers. However, this is outside the scope of this PhD.

Please arrange the 7 health-endorsement logos (A – G) in terms of

OVERALL DESIGN by using the following scale:

7 = **BEST** Overall design

1 = **WORST** Overall design

(The 7 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 7 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	

Taking into consideration the comments received from consumers regarding their preferences for the overall design of health-endorsement logos, do you have recommendation for the graphic designer to improve on the *overall design* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Please arrange the 7 health-endorsement logos (A – G) in terms of

CONSUMER (literate) UNDERSTANDING by using the following scale:

7 = **BEST** Consumer understanding

1 = **WORST** Consumer understanding

(The 7 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 7 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	

Taking into consideration the comments received from consumers regarding their preferences for the design of health-endorsement logos, do you have recommendation for the graphic designer to improve the *understanding* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Please arrange the 7 health-endorsement logos (A – G) in terms of the

USE OF COLOURS by using the following scale:

7 = **BEST** use of colours

1 = **WORST** use of colours

(The 7 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 7 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	

Taking into consideration the comments received from consumers regarding their preferences for the design of health-endorsement logos, do you have recommendation for the graphic designer to improve the *use of colours* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Please arrange the 7 health-endorsement logos (A – G) in terms of the

USE OF SYMBOLS AND/OR WORDING by using the following scale:

7 = **BEST** Use of symbols and/or wording

1 = **WORST** Use of symbols and/or wording

(The 7 health-endorsement logos can not score the same value)

Health-endorsement logo:	Score: 7 = Best, 1 = Worst
A	
B	
C	
D	
E	
F	
G	

Taking into consideration the comments received from consumers regarding their preferences for the design of health-endorsement logos, do you have recommendation for the graphic designer to improve the *use of symbols and/or wording* of any particular logo: (please state clearly which logo you are referring to)

Comments:

Addendum U: Summary of Round two comments from the experts

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa"

Nelene Koen

Summary of Expert feedback on

Round two Health-endorsement logos

Option / Logo A:
Final score received: 4.84/7

Overall design comments:
Nice and simple. Easy to understand and lint to eating. This logo may be confused with the heart mark / heart foundation mark. The knife and fork is the wrong way around and the knife should face inwards. Looks like the heart mark – maybe replace with a tick. I like this one except for the heart, which I think will confuse the consumer to imply that the product is good for the heart specifically, and too close to the heart mark. Offers the best possibilities.
Comments on understanding of the logo:
Replace better with healthier to make the link between health and eating
Comments on use of colours:
Good colour combination. Better use of colours than before – not as agricultural. Colours are busy specifically the two shades of blue. Replace the green with the green from option D. Good colour contrast. Too much blue.
Comments on use of wording and/or symbols:
I think the wording should be shaped around the plate like in Option C. Rather use "healthier choice" than "better choice" to make the connection to health matters. The knife and fork is the wrong way around. The heart may be confused with the heart mark. Change the heart to an apple. This logo gives a visual impression of what the intension of the logo is. Good symbolism of health. I do not like the use of a plate, knife and fork. The use of only the word "better" can be confusing. Better for what? I like the large font. Replace "Better" with "Healthier Choice" and then replace "Choice" with "Healthier life". Replace red heart in plate with red apple and green leaf.

Option / Logo B:

Final score received: 3.08/7

This logo has been eliminated and will not be assessed further in Round two. Therefore no re-design required.

Overall design comments:
This symbol is similar to the Discovery medical aid and might create the impression of endorsement by Discovery instead of an impartial message. Blue "ticks" are too wide – must look more like the tick in "G". I like this logo. Eye-catching. Good design. The message and logo are not in conflict.
Comments on understanding of the logo:
This symbol does not link to health and eating.
Comments on use of colours:
I like the use of just two colours, yellow might get lost on a white or see-through background though. The colours make it look a little old-fashioned, and if the blue looked more like ticks it could also imply the "better choice" aspect a little better. I think this colour combination is a bit old-fashioned and dull.
Comments on use of wording and/or symbols:
Consumer understanding might be influenced by a possible association with Discovery medical aid I prefer this wording. Symbol not clear without the wording. Sun rising? Change wording to: Better Choice / Healthy Life. Bolder font would stand out more. Change "Healthy" to "Healthier".

Option / Logo C:

Final score received: 3.88/7

Overall design comments:
I suggest you move away from just one food – the apple. I like it but think the knife and spoon makes it look too busy. Logo is too busy. Remove the knife and spoon. Much easier to read than before. A combination of inappropriate symbols and designs.
Comments on understanding of the logo:
Comments on use of colours:
Good use of colours that catches the eye. Colours well balanced.
Comments on use of wording and/or symbols:
The symbolism in not developed optimally as the green dot in the circle are only used to repeat the colour of the leaf without deeper meaning.

Is the message not too simplistic? It is not only healthy eating that promotes a healthy life. This logo gives a visual impression of what the intension of the logo is. I prefer this wording to healthy choice. Even though font is smaller, the fact that it is written in the circle makes it stand out. What about rather including a "thumbs-up" instead of the apple with knife and fork?

Option / Logo D:

Final score received: 4.51/7

Overall design comments:
Provided the heart is removed this logo signifies health without the inclusion of overly used symbols. "Choice" should be above the "y" of Healthy. Too busy, perhaps remove the heart as this implies that it is good for the heart. Great design. Too many graphics could be confusing.
Comments on understanding of the logo:
If the heart symbol is removed, the consumer should be able to understand that the logo signifies healthy lifestyle. Missing the food connection?
Comments on use of colours:
Too busy but if the red and the heart symbol is removed, the colour combination is very pleasing, I like the use of the different shades of green. Good colour combination. I think this logo has too many colours.
Comments on use of wording and/or symbols:
If the heart symbol is removed, this logo signifies health without the inclusion of overly-used symbols. I prefer neutral symbols without an apple or a heart. Logo very busy. Different font sizes may be confusing.

Option / Logo E:

Final score received: 2.71/7

This logo has been eliminated and will not be assessed further in Round two. Therefore no re-design required.

Overall design comments:
The logo gives me the impression that it is good for the heart specifically, and the hands makes me think it is "caring", like a hospital, NGO or association. Poor design. I find the hands off-putting.
Comments on understanding of the logo:
The heart deviates from general healthy eating and lifestyle.
Comments on use of colours:
Colours too busy.

Light blue does not work. Good colour combination. Missing green.
Comments on use of wording and/or symbols:
Could remind the consumer of a Ola Ice cream and the symbolism of the caring brands is not suitable. Suggest a font change. No reference to food? Heart healthy in cyanotic hands? Blue wording does not stand out in this logo.

Option / Logo F:

Final score received: 3.68/7

Overall design comments:
I like the simplicity. Good design. I like it. It works well. A bit too simple, may be better and stronger if colours changed to make it more obvious so that it stands out.
Comments on understanding of the logo:
The message is clear
Comments on use of colours:
I like the colours. Blue and green does not really grab your attention. The green from option D will make it stand out more. A bit too dull. Does not grab attention. I prefer logos where only two colours are used such as this one.
Comments on use of wording and/or symbols:
At first the wording is difficult to read because it is anti-clockwise but it forces you to read it which is good. I prefer neutral symbols such as this one without an apple or a heart. This logo gives a visual impression of what the intension of the logo is. Symbol not clear without the wording. Swivel the wording so that the wording is not upside down, Read from left to right, but on the upper side of the logo. I like the wording. “Nothing” is shown on an empty plate. Most people is SA eat with their fingers – why depict knives and forks and a green crescent moon. What about rather including a “thumbs-up” instead of the plate and knife and fork?

Option / Logo G:

Final score received: 5.31/7

Overall design comments:
I like the simplicity. Suggest you move away from just one food – the apple. I prefer this one. Clean, neat and very obvious design. Crisp and clear.
Comments on understanding of the logo:
The message is clear.
Comments on use of colours:
I like the colours. Good colour combination. Perhaps the wording can be in dark blue. I like the contrast of the colours. The red is overwhelming. Use same green as option D. Very good use of colours. Only two but still striking. I prefer logos where only two colours are used such as this one.
Comments on use of wording and/or symbols:
The symbolism might not be as evident when this logo is used on products such as breakfast cereals, as there is no connection with an apple there. Change the apple to a heart. This logo gives a visual impression of what the intension of the logo is. I prefer the wording better choice to healthy choice. The tick is easy to understand. Swivel the wording more towards the upper centre of the logo. Remove apple. Too much red. Message conflicts with logo – apples are not being promoted not are they particularly healthy. Use of fruit symbols potentially confusing. Should be more generic.

Addendum V: Logo designs (FGDs)

				
Logo A	Logo B	Logo C	Logo D	Logo E

Addendum W: Phase three consent form (English)

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM
Phase three: Focus-group Discussions

TITLE OF THE RESEARCH PROJECT:

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

REFERENCE NUMBER:

PRINCIPAL INVESTIGATOR:
Nelene Koen

ADDRESS:
Faculty of Medicine and Health Sciences
Division of Human Nutrition
Stellenbosch University
Room 3088, Clinical Building
Francie van Zyl Drive
Tygerberg

CONTACT NUMBERS:
0219389256 / 0823718029

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researchers any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

These focus-group discussions form part of a bigger study that aim to determine whether consumers read and understand food labels and to investigate the factors that influence the foods that you buy. In this part of the study the researchers would like you to give us your

opinion and feedback on some logos that were developed to indicate whether a food product is healthy or not.

The information gathered from this part of the study can help us to develop acceptable logos for healthy foods which may help consumers to make healthier food choices.

The researchers would therefore like you to take part in a group discussion with other consumers to discuss these logos. A total of four focus-group discussions will be held with consumers from Cape Town. There will be approximately six to ten participants in each discussion group and it will be conducted at a convenient location that was pre-arranged with you. The researcher will ask you some questions and document your responses. Your identity will remain anonymous and the focus-group discussions will be tape-recorded.

Why have you been invited to participate?

You have been selected to take part in the study because you are a literate adult, responsible for the food shopping in your household. You either responded to an invitation on social media to take part in a focus-group discussion on food labelling or you took part in a survey which was the first phase of this study. At the end of the survey, you indicated that you are willing to take part in a focus-group discussion to further explore issues on this topic.

What will your responsibilities be?

Your only responsibility will be to set aside some time to take part in the discussion. First, you will be required to complete a short questionnaire about yourself. This will take approximately 5 minutes. The researcher will then start with the focus-groups discussion. In total, the questionnaire and focus-group discussion will take approximately 60 minutes. Your permission is also required for the focus-group discussion to be tape-recorded. The recording will be transcribed and the information gathered will be analyzed. No identifying information will be recorded on the transcription.

You will be expected to travel to and from the venue for the focus-group discussion.

Will you benefit from taking part in this research?

There is no direct benefit to you. The results of this part of study could help us to develop acceptable food logos for healthy foods which may help consumers make healthy food choices.

Are there any risks involved in your taking part in this research?

There are no risks involved with the participation in the study. All information gathered during the focus-group discussion will be treated as confidential and your participation is anonymous.

Who will have access to the information?

The information obtained from the focus-group discussions will be treated as confidential and analyzed for research purposes. Only the research team will have access to the information provided.

Will you be paid to take part in this study and are there any costs involved?

No, you will not be paid to take part in the study but you will be compensated with a R150 voucher for your transport and time. There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

You can contact Mrs Nelene Koen, the principle investigator at 021 938 9256 or 082 371 8029 if you have any further queries or encounter any problems. You can also contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by the researcher. You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I …….. agree to take part in a research study entitled "The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

I declare that:

- I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the study doctor or researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) …….. 2016.

....

Signature of participant **Signature of witness**

Informed consent for taping of the interview

I understand that the focus-group discussion will be voice recorded to enable the researcher to accurately transcribe the discussion. It has been explained to me that the recordings and all electronic documents will be stored safely and destroyed after six months of completion of the research. I was given the opportunity to ask questions and all queries were explained to my satisfaction. I have been given a copy of the consent form.

Signed at (*place*) ..... on (*date*) ..... 2016.

....

Signature of participant **Signature of witness**

Declaration by investigator

I *(name)* ..... declare that:

- I explained the information in this document to .....
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above
- I did/did not use a interpreter. (*If a interpreter is used then the interpreter must sign the declaration below.*

Signed at (*place*) ..... on (*date*) ..... 2016.

....

Signature of investigator **Signature of witness**

Addendum X: Phase three discussion guide

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa.

General procedure prior to focus-group discussion

Refreshments to be served at arrival
Greet participants and introduce the researcher/research assistant (facilitator) and focus-group observer.
Explain the role of the facilitator and the observer.
Give a brief description of the purpose of the research study.
Obtain written, informed consent from all participants as well as consent to tape record the discussion.
Participants complete the self-administered demographic questionnaire.

Focus-group discussion

- Set the ground rules for the focus-group discussion
- Participants will be asked a series of questions of which there is no right or wrong answer.
- Everyone must feel free to participate.
- The facilitator will guide the discussion and may ask participants to move on to keep within the time limit (of 60 minutes).
- Only one person to speak at a time in order to document responses correctly.
- Although the discussion will be recorded, no names will be used throughout the discussion.
- Give participants the opportunity to ask questions.

Theme: Healthy food logos – scoring of logos (approximately 10 minutes)

For the purpose of this focus-group discussion, we will be looking at and discuss 5 different healthy food logos or health-endorsement logos. These logos were designed by the researchers and are based on the feedback received from previous focus-group discussions.

The purpose of such a logo is to indicate that the food product is a healthier option and can therefore help the consumer to make a healthier choice.

I would like you to look at each logo (Logos A – E) and score these logos according to which one you like the best (5) to which one you like the least (1). Logos may not receive the same scores. Take into consideration the overall design or look of the logo and the purpose of the logo. Please do not discuss your scoring with anyone else. There are no right or wrong answers.
Please hand your scoring sheet to the researcher.

Focus-group discussion start

We will now start with the discussion. We will start the recording now.

Questions will be rephrased that does not lead to discussion or is not well understood

Theme: Healthy food logos – discussion (approximately 50 minutes)

(This section will be repeated for each of the 5 logos. 10 minutes per logo)

Let's have a look at the logo provided on the cards in front of you.

- Please give your general impression of the logo?
- Do you like the design of the logo? Why do you like / dislike the design?
- How do you feel about the colours and fonts that were used?
- In general, is the logo attractive to you? Please explain.
- Is the picture/symbol used in the logo acceptable? Please elaborate.
- If you were to look at the logo for the first time on a product, what would you understand about this specific logo?

Thank you very much for taking part in this focus-group discussion. Your input is very valuable to us and we appreciate you taking the time to take part.

Addendum Y: Phase three ranking sheet

Phase three: Focus-group discussions /
Fase drie: Fokusgroep besprekings

Participant code / *Deelnemer kode:* _____

"The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa."

All information will be treated as confidential. /
Alle informasie sal konfidensieel hanteer word.

Please arrange the 5 logos (A – E) in terms of
OVERALL ACCEPTABILITY and PREFERENCE by using the following scale:
Rangskik asseblief die 5 logos (A-E) ten opsigte van ***ALGEHELE AANVAARBAARHEID EN VOORKEUR*** *deur die volgende skaal te gebruik:*

5 = **BEST** overall acceptability and preference /
5 = ***BESTE*** *algehele aanvaarbaarheid en voorkeur*

1 = **WORST** overall acceptability and preference /
1 = ***SLEGSTE*** *algehele aanvaarbaarheid en voorkeur*

Logo:	Score / *Telling*: 5 = Best / *Beste*, 1 = Worst / *Slegste*
A	
B	
C	
D	
E	

(The 5 logos can not score the same value)
(Die 5 logos kan nie dieselfde telling ontvang nie)

Addendum Z: Ethics approval letter

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jou kennisvennoot • your knowledge partner

Approval Notice
New Application

01-Dec-2015
Koen, Nelene N

Ethics Reference #: S15/08/164

Title: **The influence of nutrition labelling and logos on food purchasing behaviour in the City of Cape Town, Western Cape, South Africa.**

Dear Mrs. Nelene Koen,

The **New Application** received on **05-Aug-2015**, was reviewed by Health Research Ethics Committee 2 via Committee Review procedures on **21-Oct-2015** and has been approved.
Please note the following information about your approved research protocol:

Protocol Approval Period: **21-Oct-2015 -20-Oct-2016**

Present Committee Members:
Weber, Franklin CFS
Lamberts, Robert RP
Jordaan, Gerhardus GP
Barsdorf, Nicola N
Etoe, Sheila SL
Holgate, Sandilee S
Fernandez, Pedro PW
Van der Merwe, Anita AS
Makiwane, Memela MM
Burger, Elsie EH
Fortuin, Ashleen A
Blouws, Firnley F
Ronacher, Katharina K
Engelbrecht, Susan S
Marais, Debra D
Edwards, C E

Please remember to use your **protocol number** (**S15/08/164**) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:
Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired.
The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.
Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372
Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.
For standard HREC forms and documents please visit: www.sun.ac.za/rds

If you have any questions or need further assistance, please contact the HREC office at 219389207.

Included Documents:

PhD Evaluation committee report
Protocol Synopsis
CV E Wentzel-Viljoen
CV R Blaauw
HREC checklist
Application form
Declaration N Koen
Declaration R Blaauw
Cover letter
Protocol
Declaration E Wentzel-Viljoen
CV N Koen

Sincerely,

Mertrude Davids
HREC Coordinator
Health Research Ethics Committee 2

Addendum AA: Phase two extracted themes, categories and codes

THEME: SHOPPING (SHOP)

SHOP frequency – how often is the shopping done
SHOP planning – Is the shopping trip planned or done according to need
SHOP where – Description of where and type of shop

THEME: FACTORS INFLUENCING FOOD PURCHASING (PRODUCT CHOICE)

Economic, brand, marketing

PRODUCT CHOICE price – anything price related that influences the choice of product
PRODUCT CHOICE Specials – specials or bulk buys that will influence product choice
PRODUCT CHOICE Brand – when a specific brand influence product choice
PRODUCT CHOICE Media – anything included in the media (television, newspaper, magazines etc.) that will influence the choice of product
PRODUCT CHOICE Store incentives – when aspects relating to store/chain incentives (store cards, accumulation of store points, discounts, cash back) influence product choice
PRODUCT CHOICE Store – when the store itself (cleanliness, layout etc.) influence product choice

Family, cultural

PRODUCT CHOICE Family / size – anything related to the size of the family, the number of people in the household or the composition of the family (including children) that will influence the choice of product
PRODUCT CHOICE Living conditions – living conditions (incl. house, available resources) that have an impact on product choice
PRODUCT CHOICE Culture – where culture influence product choice
PRODUCT CHOICE Religion – where religion influence product choice

Convenience

PRODUCT CHOICE convenience – things related to convenience that influences the choice of product

Product display and packaging

PRODUCT CHOICE Packaging size/look– when the look or size of the packaging play a role in product choice
PRODUCT CHOICE pre-preparation or storage – when the pre-preparation of a product (washed, chopped, pre-prep products influence product choice
PRODUCT CHOICE display – when the display / lay-out of a product in the store influence product choice
PRODUCT CHOICE Recipes – when a recipe on the packaging influence product choice

Country of Origin and Expiry dates

PRODUCT CHOICE Expiry dates – expiry dates on the product that will influence product choice

PRODUCT CHOICE Country of Origin – when the country where product was made or manufactured influence product choice

Nutrition information

PRODUCT CHOICE nutrition information table – when the nutrition information table influence product choice
PRODUCT CHOICE Health-endorsement logos – when the presence of a health-endorsement logo influence product choice
PRODUCT CHOICE claims – when a claim made on a product influence product choice
PRODUCT CHOICE ingredients – when the list of ingredients influence product choice

Preference, Quality and Taste

PRODUCT CHOICE Quality – when the perceived quality of a a product influence product choice
PRODUCT CHOICE Taste – when the perceived quality of a product influence product choice
ENVIRONMENT CHOICE Familiar products – anything related to a participant choosing a product because it is familiar to them
ENVIRONMENT CHOICE Food preference – when preference for certain food products (e.g. meat vs vegetables) influence product choice

Environment, Genetically modified (GM) foods, Organic foods

PRODUCT CHOICE Environmentally friendly – when product choice is influenced by whether a product is environmentally friendly or have a low carbon footprint
PRODUCT CHOICE GM and organic – when product choice is influenced by whether the product is genetically modified or contains GM ingredients or whether it is organic

THEME: EXPECTATIONS & BARRIERS (EXPECTATIONS)

EXPECTATION packaging – Any barriers or expectations experienced by consumers related to the packaging of a product
EXPECTATION pictures and symbols - Any barriers or expectations experienced by consumers related to the use of pictures, symbols or colours
EXPECTATION nutrition information - Any barriers or expectations experienced by consumers related to the nutrition information provided on a product
EXPECTATION Brand - Any barriers or expectations experienced by consumers related to the specific product brand
EXPECTATION simplify wording/font - Any barriers or expectations experienced by consumers related to the fonts (colour/size/placements) and wording used on a product
EXPECTATION time – when time is a barrier to reading food labels
EXPECTATION trust – when consumers do not trust the information provided to them on food labels

THEME: UNDERSTANDING (UNDERSTANDING)

UNDERSTANDING labelling– related to how the nutrition information on the label is understood

THEME: MOTIVATION FOR READING NUTRITION INFORMATION (MOTIVATION)

MOTIVATION Health – when a specific health condition is a motivator for reading nutrition information on labels

MOTIVATION Avoiding ingredients or allergens – when consumers read nutrition information to look for the presence or absence of specific ingredients or allergens

MOTIVATION Diet – when consumers read the nutrition information because they want to lose weight, maintain body weight or to pick up weight

MOTIVATION Maintain health - when consumers read nutrition information to stay healthy

MOTIVATION Prevent disease – when consumers read nutrition information to prevent specific diseases

THEME: HEALTH-ENDORSEMENT LOGOS (LOGOS)

LOGOS One – feelings about the use of one HEL for all food products

LOGOS HEL – information about the design and understanding of existing HELs

LOGOS Meaning – information about the meaning of HELs in general

Addendum AB: Phase three extracted themes and codes

THEME: OVERALL DESIGN AND ATTRACTIVENESS (DESIGN)

Related to the overall design of the logo and whether consumers find the logo attractive

DESIGN Option A
DESIGN Option B
DESIGN Option C
DESIGN Option D
DESIGN Option E

THEME: COLOURS (COLOURS)

Related to the colours and colour combinations used in the logo

COLOURS Option A
COLOURS Option B
COLOURS Option C
COLOURS Option D
COLOURS Option E

THEME: FONT AND WORDING (FONT)

Related to the font type, size and specific wording used in the logo

FONT Option A
FONT Option B
FONT Option C
FONT Option D
FONT Option E

THEME: USE OF PICTURES AND SYMBOLS (PICTURES)

Related to the pictures and symbols used in the logo and its meaning

PICTURES Option A
PICTURES Option B
PICTURES Option C
PICTURES Option D
PICTURES Option E

THEME: UNDERSTANDING (UNDERSTANDING)

Related to the understanding of the logo and whether the logo conveys the correct message

UNDERSTANDING Option A
UNDERSTANDING Option B
UNDERSTANDING Option C
UNDERSTANDING Option D
UNDERSTANDING Option E

Addendum AC: Summary of FGDs on HELs

The influence of nutrition labelling and logos on food-purchasing behaviour in Cape Town, Western Cape, South Africa"

Nelene Koen

Summary of focus-group discussions on health-endorsement logos

General Overall Comments:

Colours: Consumers felt that different greens, yellows, oranges, browns etc. work well on food products as this symbolises health and food. Although many consumers liked the red in the logos, some indicated that too much red can indicate danger and thus foods to avoid. Many felt that blue was not appropriate to use on food labels (with the exception of Logo C) as it was associated with medicine and cleaning agents.
Wording/Font: All preferred Healthy Choice over Healthier Choice. Fonts used in Option C and E were preferred, although many agreed that capital letters (apart from Logo C) looked cleaner and simpler. Font in logo E was preferred over the font used in Logo D as it was more "spaced out" and easier to read.
Pictures/Symbols: The use of a specific type of food (such as an apple) should be avoided on the logos as it confused consumers. Many indicated that it is not appropriate to use a logo containing an apple, on for example a lasagne or margarine etc. Other, more generic health symbols should rather be used.
Understanding: Logos with a clear link to health and / or food was preferred.

Option / Logo A:

Final score received: 3.28/5

Overall design comments:
This is a very traditional design. This logo is colourful and there is a clear link with food, although the logo is too big. The knife and fork should be placed next to the plate and not on top of it.
Comments on understanding of the logo:
This logo is easy to understand and there is a clear link with health and food.
Comments on use of colours:
This logo is colourful, however consumers did not like the blue in the logo. According to them, blue is associated with medicine, cleaning agents etc.
Comments on use of wording and/or symbols:
The wording should read: "Healthy Choice" or "Healthy Choice Healthy Life" and not Healthier Choice. The font should be smaller and in capital letters (similar to the types of font used in Option B or E). The apple on a plate with a knife and fork was confusing to consumers. Although they understood the link between apple and health, many indicated that you cannot eat an apple with a knife and fork and therefor it should not be included on the plate.

A different health symbol (however not a heart) or another appropriate symbol such as a tick could rather be placed on the plate.

Option / Logo B:

Final score received: 2.64/5

This logo has been eliminated and will not be assessed further. Therefore, no re-design required.

Overall design comments:
The logo is too busy and has too many different elements. Some consumers said the logo looks like a road sign or symbol for a medical association.
Comments on understanding of the logo:
Some consumers struggled to make the link with health and food, especially when the text was not considered (for illiterate consumers).
Comments on use of colours:
Consumers indicated that the blue is too dark and the white font can be difficult to read for consumers wearing glasses/older consumers. Overall, consumers did not like the colour combinations used in this logo, although they were positive about the green used in the logo.
Comments on use of wording and/or symbols:
Consumers liked the Healthy Choice Healthy Life slogan, but indicated that the slogan does not match the thumbs up design. Consumers commented on the two "dots" used in the circle/design and said that they do not understand what it was for. They indicated that it makes the logo "too busy". The font is too small. The thumbs up was liked by some and disliked by others. Some consumers said that it looks like someone hiking next to the road while others made the link with social media and WhatsApp.

Option / Logo C:

Final score received: 3.39/5

Overall design comments:
Consumers were very happy with the overall design of this logo.
Comments on understanding of the logo:
This logo is easy to understand, there is a clear link with health and food and comments were made that the logo has a "positive" and "happy" feel.
Comments on use of colours:
Overall, comments on the use of colours were very positive, as most indicated that the colours used are associated with health and well-being.
Comments on use of wording and/or symbols:
Consumers liked the "Healthy Choice" wording. Some consumers said that it looked like the fonts of "Healthy" and "Choice" were different and that this bothered them. In general, the font can be a bit smaller. Many suggested that the two lines below the blue man should resemble a tick (therefore the left side should be slightly shorter and the right side slightly longer.)

Option / Logo D:

Final score received: 2.61/5

This logo has been eliminated and will not be assessed further. Therefore, no re-design required.

Overall design comments:
Consumers felt this logo was too simple and boring and did not like the colour combinations.
Comments on understanding of the logo:
Consumers said that there was no clear link with health and food apart from the text.
Comments on use of colours:
Consumers did not like the colour combination and indicated that it was 'boring", too simple, dull and plain. Once again, consumers said that they associated the blue with medicine / medical.
Comments on use of wording and/or symbols:
Consumers indicated that "The Healthier Choice" should be replaced with "Healthy Choice". The font used should be more spaced out – similar to the font used in Option E. Although the majority of consumers understood the meaning of a tick, many said that they would prefer to see a stronger link with food and health. The green circle confused some consumers as some indicated that it looks like a moon or the halaal symbol used on food products.

Option / Logo E:

Final score received: 3.08/5

Overall design comments:
In general, consumers said that this logo attracts attention and that the design is "pretty".
Comments on understanding of the logo:
This logo is easy to understand and there is a clear link with health and food.
Comments on use of colours:
Although consumers liked the colour combination, some said that too much red is used in this logo and that the red can symbolise danger. The text should rather be in green or a different colour.
Comments on use of wording and/or symbols:
"Healthier Choice" should be replaced with "Healthy Choice". Although they understood the link between apple and health, many indicated that you cannot place an apple on different food products as this would be confusing to the consumer. A different health symbol (however not a heart) or another appropriate symbol could rather be used here. Appropriate symbols mentioned were plants/trees/combination of growing plants etc. or something from nature as seen in other health logos.

Addendum AD: Final three logo designs

Logo A	Logo B	Logo C